

Gravina Access Project
Section 404/Section 10 Permit Application for the Preferred Alternative (F1)

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)			
1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED
(ITEMS BELOW TO BE FILLED BY APPLICANT)			
5. APPLICANT'S NAME Alaska Department of Transportation and Public Facilities; Roger Healy		8. AUTHORIZED AGENT'S NAME AND TITLE HDR Alaska, Inc.; Mark Dalton	
6. APPLICANT'S ADDRESS DOT&PF Southeast Region 6860 Glacier Highway Juneau, Alaska 99801-7999		9. AGENT'S ADDRESS HDR Alaska, Inc. 2525 C Street, Suite 305 Anchorage, Alaska 99503	
7. APPLICANT'S PHONE NOS. W/AREA CODE Phone (907) 465-1821 Fax (907) 465-4414		10. AGENT'S PHONE NOS. W/AREA CODE Phone (907) 274-2000 Fax (907) 274-2022	
11. STATEMENT OF AUTHORIZATION			
I hereby authorize Mark Dalton of HDR Alaska, Inc. to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.			
_____ APPLICANT'S SIGNATURE		_____ DATE	
NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY			
12. PROJECT NAME OR TITLE Gravina Access Project			
13. NAME OF WATERBODY, IF KNOWN Tongass Narrows		14. PROJECT STREET ADDRESS Not Applicable	
15. LOCATION OF PROJECT <div style="display: flex; justify-content: space-between;"> _____ Ketchikan COUNTY _____ Alaska STATE </div>			
16. OTHER LOCATION DESCRIPTIONS, IF KNOWN Township 75 S., Range 90 E., Sections 16, 22, 23, 26, 27, 35, and 36 Township 76 S., Range 90 E., Section 01 Township 75 S., Range 91 E., Sections 29, 30, 31, and 32 Township 76 S., Range 91 E., Section 06 Copper River Meridian			
17. DIRECTIONS TO THE SITE <u>To access the Preferred Alternative (F1) from downtown Ketchikan:</u> Follow Tongass Avenue to 1/4 mile south of the intersection of Tongass Avenue and Deermount Street. This is the location of the bridge terminus on Revillagigedo Island. See attached project description for more details.			

18. Nature of Activity

Construct two bridges and adjoining arterial roadway across Tongass Narrows via Pennock Island to connect Revillagigedo and Gravina Island. The new connection will require fill and structure placement in Section 10/404 waters. The 2-lane arterial roadway will have an approximately 24-foot paved surface with approximately 8-foot wide shoulders. The bridges would have the two 12-foot lanes, 8-foot wide shoulders, and an approximately 8-foot wide sidewalk. See attached project description and Sheet 16 for more details.

19. Project Purpose

The purpose of this project is to improve surface transportation between Revillagigedo Island, home of Ketchikan, Saxman, and other communities, and Gravina Island, the location of Ketchikan International Airport and adjoining land that offer recreational and development potential in Southeast Alaska. Improved transportation access to Gravina Island would provide better service to the airport and allow development of the large tracts of land situated on the island. See attached project description for more details.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

To construct roadway embankment

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards

Approximate Fill Amounts in Wetlands (type of fill has not yet been determined)

Total Fill: 500,000 cy

The two bridges across Tongass Narrows require the placement of 14 bridge piers within waters under the jurisdiction of Section 10 of the Rivers and Harbors Act.

22. Surface Area in Acres of Wetlands or Other Waters Filled

A total of **103.3** acres of wetlands will be filled. See attached project description and figures for more details.

23. Is Any Portion of the Work Already Complete? Yes _____ No XX, IF YES, DESCRIBE THE COMPLETED WORK**24. Addresses of Adjoining Property Owners, Lessees, Etc. Whose Property Adjoins the Waterbody**

The attached table lists property owners within 500 feet of either side of the Preferred Alternative (F1).

25. List of Other Certifications or Approvals/Denials Received from other Federal, State or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL	ID NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
Alaska Division of Governmental Coordination	ACMP Consistency Determination		To be determined		
Alaska Department of Environmental Conservation	Section 401 Water Quality Certification		Concurrent with this application		
Alaska Department of Natural Resources	Title 41 Fish Habitat Permit		To be determined		
U.S. Environmental Protection Agency	Construction NPDES General Permit		To be determined		
U.S. Coast Guard	Section 9 Bridge Permit		To be determined		

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT

DATE

SIGNATURE OF AGENT

DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that : Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.

Alaska Department of Transportation and Public Facilities Gravina Access Project

Project Description

The Alaska Department of Transportation and Public Facilities (ADOT&PF), in cooperation with the Federal Highway Administration, is pursuing alternatives for improving access between Revillagigedo Island and Gravina Island in Southeast Alaska. This project, called the Gravina Access project, is one of 16 high priority projects funded in the state under the Federal Transportation Equity Act for the 21st Century (TEA-21). The project involves examining ways to link Revillagigedo Island, home of Ketchikan, Saxman, and other communities, to Gravina Island, the location of the Ketchikan International Airport and adjoining lands that offer recreational and development potential. Currently, a small ferry across Tongass Narrows provides the only regular access to Gravina Island and it is dedicated solely to airport use. Access to the remainder of the island is not available except by watercraft. Improved transportation access to Gravina Island would provide better service to the airport and allow for development of the large tracts of land situated on the island.

In the past three decades, studies have analyzed possible crossings between Revillagigedo and Gravina and evaluated several types of bridge and tunnel structures for the crossing. While there is some previous information available, much of it is outdated or incomplete. Because this project is funded largely by federal dollars, the project must comply with the National Environmental Policy Act (NEPA). NEPA requires the study of all reasonable alternatives and disclosure of environmental impacts associated with each alternative to the public and decision-makers.

The project will be studied, designed, and built over the next five years in three distinct phases; (1) NEPA-environmental; (2) design; and (3) construction. The scope of work for the project's first phase will provide engineering and environmental services to prepare a NEPA analysis; coordinating with federal, state, borough, city, and other local agencies; and making presentations at public hearings and scoping meetings. Among the topics that will be considered in the process include: Land Use, Economic Impacts, Navigation Impacts, Aviation Impacts, Population, Employment and Community Character, Cultural Resources, Air Quality, Noise, Water Quality, Wetlands, and Fish and Wildlife. Public involvement activities are anticipated to occur throughout the project.

1. PROJECT HISTORY

In the past three decades, studies have analyzed possible crossings between Revillagigedo and Gravina and evaluated several types of bridge and tunnel structures for the crossing. While there is some previous information available, much of it is outdated or incomplete. Improving the connection between these two islands has long been a topic of interest.

- In 1973, the Ketchikan International Airport is constructed and shuttle ferry service begins.
- In 1973, the State of Alaska examined eight proposed bridge crossings.
- In 1981, the Ketchikan Gateway Borough examined bridge and underwater tube crossings.
- In 1984, Tippetts-Abbott-McCarthy-Stratton provided a cost analysis of proposed bridge, tube, and ferry crossings.
- In 1988, the Ketchikan Gateway Borough passed Resolution 794 supporting a "hard link"

- crossing and the preparation of an environmental impact statement (EIS).
- In 1989, the Ketchikan Gateway Borough studied road routes on Pennock and Gravina Islands to the airport.
- In 1991, the Alaska Legislature authorized funding for the Ketchikan "Hard Link" EIS.
- In 1994, the DOT&PF prepared an in-house draft EIS of ferry, bridge, and tunnel crossing options.
- Finally, in 1998 the Federal Transportation Equity Act for the 21st Century (TEA-21) allocated funds specifically for this project. Additional funding will be required to begin construction of a selected access alternative

2. PROJECT PURPOSE AND NEED

Purpose

The purpose of the Gravina Access Project is to improve surface transportation between Revillagigedo Island and Gravina Island.

Need

The need for improving access is threefold:

- To provide the Ketchikan Gateway Borough and its residents more reliable, efficient, convenient, and cost-effective access for vehicles, bicycles, and pedestrians to Borough lands and other developable or recreation lands on Gravina Island in support of the Borough's adopted land use plans.
- To improve the convenience and reliability of access to Ketchikan International Airport for passengers, airport tenants, emergency personnel and equipment, and shipment of freight.
- To promote environmentally sound, planned long-term economic development on Gravina Island.

3. ALTERNATIVES CONSIDERED

During the spring of 2000, the ADOT&PF developed 18 build concepts for crossing Tongass Narrows. These concepts were based on previous studies, input from agencies and the public, engineering analysis, and the objectives in the purpose and need statement for the project. The build concepts consisted of 11 bridge options, two tunnel options, one tunnel-and-bridge option, and four supplemental ferry options, and a No Action option. These initial options were reviewed with input from the Ketchikan community and local, state, and federal agencies, tribes and other Native organizations, to identify reasonable alternatives for the Gravina Access Project. Factors related to cost, environmental impacts, and transportation impacts were examined for each of the initial options, and those options that were not considered practical or feasible from a technical and economic standpoint were eliminated from further consideration. Additional technical studies and public and agency input resulted in the identification of nine reasonable build alternatives (six bridge alternatives, C3[a], C3[b], C4, D1, F1, and F3; and three ferry alternatives, G2, G3, and G4) and the No Action alternative for the Gravina Access Project.

NO ACTION ALTERNATIVE

Under the No Action Alternative, no bridge would be constructed and no additional ferry service would be provided between Revillagigedo Island and Gravina Island. The only public access between the islands would continue to be provided by the existing airport ferry service across Tongass Narrows, private boats, and floatplanes. On Revillagigedo Island, the existing ferry

terminal is located 2.8 miles north of downtown Ketchikan; on Gravina Island, the terminal is on the waterfront, just east of the airport terminal.

ALTERNATIVE C3(A)

Alternative C3(a) includes a bridge across Tongass Narrows approximately 1,600 feet north of the airport terminal. The bridge would be 5,690 feet long, and have a maximum height of approximately 250 feet. The main span of the bridge would have a vertical navigational clearance of 200 feet above high tide and a horizontal navigational clearance of approximately 550 feet. The main span of the bridge would be centered on the cruise ship tracklines and would be over water with depths in excess of 40 feet (at low tide) to accommodate deep draft vessels. These clearances would accommodate one-way passage of cruise ships and two-way passage of most other ships (including Alaska Marine Highway System [AMHS] ferries).



Alternative C3(a) bridge from north of Wolf Point on Tongass Avenue, looking south.

On Revillagigedo Island, the alignment would connect to Signal Road at North Tongass Avenue. From this terminus, the alignment would traverse the hillside southward, gain elevation and turn southwestward. The bridge would cross Tongass Avenue and Tongass Narrows, and then turn southward to parallel the airport runway and touch down (reach the ground surface) on Gravina Island south of the terminal. A 0.4-mile-long airport return loop road would connect the airport terminal and the bridge terminus. The main road would continue around the southern end of the airport runway and then arc northward, extending parallel to and west of the airport runway approximately 2.2 miles to the northern end of the Airport Reserve zone. At the southern end of the runway, the road would be constructed at a grade low enough to accommodate the planned future expansion of the runway, with the runway extended as an overpass of the road.

ALTERNATIVE C3(B)

The Alternative C3(b) bridge would be approximately 4,250 feet long, and have a maximum height of approximately 195 feet. The main span of this bridge would have a vertical navigational clearance of 120 feet above high tide and a horizontal navigational clearance of approximately 500 feet. The main span would be located over water with depths in excess of 40 feet at low tide. These clearances would accommodate passage of AMHS ferries, but not larger cruise ships.



Alternative C3(b) bridge from north of Wolf Point on Tongass Avenue, looking south.

Alternative C3(b) would have the same general alignment on Revillagigedo and Gravina Islands as Alternative C3(a); however, with a lower bridge profile, the position of the C3(b) bridge over Tongass Narrows and at its touchdown on Gravina Island (near the airport terminal) would be north of the C3(a) alignment. This alternative would not need an airport return loop road because the bridge would touch down in front of the airport terminal.

ALTERNATIVE C4

The Alternative C4 bridge would be approximately 4,980 feet long and have a maximum height of approximately 250 feet. The main span of this bridge would have a vertical navigational clearance of 200 feet and a horizontal navigational clearance of approximately 550 feet. The main span of the bridge would be centered on the cruise ship tracklines and would be over water with depths in excess of 40 feet (at low tide) to accommodate deep draft vessels. These clearances would accommodate one-way passage of cruise ships and two-way passage of most other ships, including AMHS ferries.



Alternative C4 bridge from north of Wolf Point on Tongass Avenue, looking south.

On Revillagigedo Island, the alignment would connect to Tongass Avenue north of Cambria Drive, across from the access to the existing ferry terminal. From this terminus, it would extend northward and traverse the hillside around the quarry; the bridge would cross over Tongass Avenue and Tongass Narrows, turn southward to parallel the airport runway, and then touch down on Gravina Island south of the airport terminal. A 0.4-mile-long airport return loop road would connect the airport terminal and the bridge terminus. The main road would continue around the southern end of the airport runway and then arc northward, extending parallel to and west of the airport runway approximately 2.2 miles to the northern end of the Airport Reserve zone. At the southern end of the runway, the road would be constructed at a grade low enough to accommodate the planned future expansion of the runway, with the runway extended as an overpass of the road.

ALTERNATIVE D1

The Alternative D1 bridge would cross Tongass Narrows directly east of the airport terminal. The bridge would be approximately 3,220 feet long and have a maximum height of approximately 160 feet. The main span of this bridge would have a vertical clearance of 120 feet above high tide and a horizontal clearance of 500 feet. The main span would be located over water with depths in excess of 40 feet at low tide. These clearances would accommodate passage of AMHS ferries, but not larger cruise ships.



Alternative D1 bridge from near Wolf Point on Tongass Avenue, looking south.

On Revillagigedo Island, the alignment would connect to Tongass Avenue at Cambria Drive near the existing airport ferry terminal. From this terminus, the alignment would rise along the hillside and turn westward; the bridge would cross over Tongass Avenue and Tongass Narrows, and then turn southward to parallel the shoreline on Gravina Island and touch down south of the airport terminal. A 0.4-mile-long airport return loop road would connect the airport terminal and the bridge terminus. The main road would continue around the southern end of the airport runway and then arc northward, extending parallel to and west of the airport runway approximately 2.2 miles to the northern end of the Airport Reserve zone. At the southern end of the runway, the road would be constructed at a grade low enough to accommodate the planned future expansion

of the runway, with the runway extended as an overpass of the road.

ALTERNATIVE F1 (PREFERRED)

Alternative F1 would cross Tongass Narrows via Pennock Island with two bridges. One bridge would cross the East Channel and the other would cross the West Channel. The East Channel bridge would be approximately 3,715 feet long and have a maximum height of approximately 250 feet. The bridge would have a vertical navigational clearance of 200 feet above high tide and a horizontal navigational clearance of approximately 550 feet. The main span of the bridge would be centered on the cruise ship tracklines and would be over water with depths in excess of



Alternative F1 bridges and Pennock Island from mid-Tongass Narrows near the airport, looking south.

40 feet (at low tide) to accommodate deep draft vessels. These clearances would accommodate one-way passage of cruise ships and two-way passage of most other ships, including AMHS ferries. The West Channel bridge would be approximately 2,750 feet long and have a maximum height of approximately 160 feet. The bridge would have a vertical navigational clearance of 120 feet above high tide and a horizontal navigational clearance of approximately 500 feet. The main span would be located over water with depths in excess of 40 feet at low tide. These clearances would accommodate passage of AMHS ferries, but not larger cruise ships.

On Revillagigedo Island, Alternative F1 would connect to Tongass Avenue just south of Tatsuda's grocery store and near the southern end of the quarry. From this terminus, the alignment would rise to the southeast along the hillside (and east of the tank farm, the cemetery, and the USCG Station), turn westward (skirting the southern end of the USCG Station property, north of the Forest Park subdivision) and cross over Tongass Avenue approximately 1.4 miles south of downtown Ketchikan, then cross the East Channel to Pennock Island. The roadway would cross Pennock Island at grade. From Pennock Island, the West Channel bridge would cross to Gravina Island, touching down approximately 2.7 miles south of the airport runway. The road would continue northward approximately 4.9 miles to the northern end of the Airport Reserve zone. A 1.2-mile airport access road would be constructed at the southern end of the airport runway. The airport access roadway would be constructed at a grade low enough to accommodate the planned future expansion of the runway, with the runway extended as an overpass of the road.

ALTERNATIVE F3

Like Alternative F1, Alternative F3 would have two bridges that cross Tongass Narrows via Pennock Island. One bridge would cross East Channel and the other bridge would cross West Channel. The East Channel bridge would be approximately 2,065 feet long and have a maximum height of approximately 140 feet. The bridge would have a vertical navigational clearance of 60 feet above high tide, (lower than any of the other bridges), and a horizontal clearance of approximately 500 feet. The main span would be located over water with depths in excess of 40 feet at low tide. These clearances

would not accommodate passage of AMHS ferries or taller cruise ships, which currently use the East Channel as their primary navigational route. The West Channel bridge would be approximately 3,270 feet long and have a maximum height of approximately 250 feet. The bridge would have a vertical navigational clearance of 200 feet above high tide and a horizontal navigational clearance of approximately 550 feet. The main span would be located over water with depths in excess of 40 feet at low tide. These clearances would accommodate one-way passage of cruise ships and two-way passage of most other ships, including AMHS ferries.



Alternative F3 bridges and Pennock Island from mid-Tongass Narrows near the airport, looking south.

On Revillagigedo Island, the East Channel bridge would connect to Tongass Avenue, approximately 1.5 miles south of downtown Ketchikan between the USCG Station and the Forest Park subdivision. From this terminus the bridge would cross the East Channel to Pennock Island. The roadway would cross Pennock Island at grade. From Pennock Island, the West Channel bridge would cross to Gravina Island, touching down approximately 2.7 miles south of the airport runway. The road would continue northward approximately 4.9 miles to the northern end of the Airport Reserve zone. A 1.2-mile airport access road would be constructed at the southern end of the airport runway. The airport access roadway would be constructed at a grade low enough to accommodate the planned future expansion of the runway, with the runway extended as an overpass of the road.

In response to concerns expressed by cruise ship pilots, ADOT&PF proposes widening a portion of the West Channel to improve its navigational characteristics and mitigate adverse impacts to cruise ships transiting the West Channel. The channel widening would occur in the narrowest part of the West Channel. Currently, the width of the navigable portion of West Channel (i.e., with respect to large cruise ships) is approximately 400 feet at its narrowest point with a minimum depth of 40 feet below low water. With the proposed channel modifications, this portion of the West Channel would have a channel width of 750 feet: the center 550 feet would have a minimum depth of 40 feet below low water and both sides of the channel would have a minimum depth of 30 feet below low water. The deepest part of the channel would be centered on the navigational opening of the West Channel bridge.

The bridge would be located at the southern end of the widened channel, which would extend approximately 2,000 feet north of the bridge. South of the bridge crossing, and north of the channel improvement area, the existing channel is wider and deeper than the proposed improved channel.

ALTERNATIVE G2

Alternative G2 would augment the existing airport ferry service, with the existing ferry service continuing to operate at its current location and under its current schedule. Alternative G2 would be a new ferry service for vehicles and passengers between Peninsula Point on Revillagigedo Island and Lewis Point on Gravina Island, crossing Tongass Narrows approximately 2 miles north of the airport

This alternative would require construction of a new ferry terminal on each side of Tongass Narrows and two new ferry vessels. A 4.3-mile road would be constructed on Gravina Island that would extend from the ferry terminal southward approximately 2.6 miles, wrap around the southern end of the airport runway, and then turn northward to the airport terminal. The road at the southern end of the runway would be constructed at a grade low enough to allow for planned future expansion of the runway, with the runway extended as an overpass of the road.



Alternative G2 ferry from Gravina Island shoreline near the northern end of the airport runway, looking north.

ALTERNATIVE G3

Alternative G3 would augment the existing airport ferry service, with the existing ferry service continuing to operate at its current location and under its current schedule. Alternative G3 would be new ferry service for vehicles and passengers between Ketchikan (near the Plaza Mall at Jefferson Street) on Revillagigedo Island and a location approximately 0.6 miles south of the airport runway on Gravina Island.



Alternative G3 ferry from the north parking area adjacent to Plaza Port West, looking northwest toward Gravina Island.

This alternative would require construction of a new ferry terminal on each side of Tongass Narrows and two new ferry vessels. Dredging may be required to provide adequate navigational depths for the ferry terminal on Revillagigedo Island. The existing breakwater could also be widened and extended for use as the ferry terminal pier. A road would be constructed on Gravina Island from the ferry terminal northward approximately 3.0 miles to the northern end of the Airport Reserve zone. A 1.2-mile airport access road would be constructed around the southern end of the airport. The road at the southern end of the runway would be constructed at a grade low enough to allow for future planned expansion of the runway, with the runway extended as an overpass of the road.

ALTERNATIVE G4

Alternative G4 would be a new ferry service for vehicles and passengers between Peninsula Point on Revillagigedo Island and Lewis Point on Gravina Island, crossing Tongass Narrows approximately 2 miles north of the airport. Alternative G4 would be new ferry service for vehicles and passengers adjacent to the existing airport ferry route, crossing Tongass Narrows 2.8 miles north of downtown.

This alternative would require construction of a new ferry terminal on each side of Tongass Narrows, adjacent to the existing airport ferry terminals, and two new ferry vessels. A 3.2-mile road would be constructed on Gravina Island that extends southward from the airport ferry terminals; the roadway would wrap around the southern end of the airport runway, and then turn northward, extending parallel to and west of the airport runway approximately 2.2 miles to the northern end of the Airport Reserve zone. The road at the southern end of the runway would be constructed at a grade low enough to allow for future planned expansion of the runway, with the runway extended as an overpass of the road.

WETLAND IMPACTS

Table 1 quantifies (in terms of footprint acres) the anticipated impacts of each alternative on the different wetland types. These calculations were obtained by overlaying the footprint of each alternative on the wetland mapping using GIS analysis functions. The values are shown as acreage comparisons only.

TABLE 1
IMPACTS ON WETLANDS, PONDS, AND UPLANDS (ACRES)

Wetland Type	No Action	Bridge Alternatives ¹						Ferry Alternatives ²		
		C3(a)	C3(b)	C4	D1	F1	F3	G2	G3	G4
Forested Wetlands	0.0	15.6	14.2	10.6	8.0	24.5	13.0	14.2	10.0	7.7
Shrub/Scrub Wetlands	0.0	3.1	3.0	3.1	3.0	17.9	14.4	2.9	6.5	2.9
Muskegs	0.0	25.3	25.1	25.1	25.1	60.9	57.7	25.3	29.4	24.8
Intertidal Marshes and Meadows	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.7	0.1
Total Wetland Impacts	0.0	44.1	42.4	39.0	36.3	103.3	85.2	42.5	47.5	35.4
Ponds	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Uplands (Nonwetlands)	0.0	5.1	9.1	10.4	8.6	10.7	4.8	7.6	7.0	4.7

¹ Bridge Alternatives:

Alternative C3(a) = 200' Bridge between Signal Road and South of Airport Terminal

Alternative C3(b) = 120' Bridge between Signal Road and Airport Terminal

Alternative C4 = 200' Bridge Between Tongass Avenue (North of Cambria Drive) and South of Airport Terminal

Alternative D1 = 120' Bridge Between Tongass Avenue (near Existing Ferry) and Airport Terminal

Alternative F1 = Bridges (200' East and 120' West) Between Tongass Avenue and Airport, via Pennock Island

Alternative F3 = Bridges (60' East and 200' West) Between Tongass Avenue and Airport, via Pennock Island

² Ferry Alternatives:

Alternative G2 = Ferry Between Peninsula Point and Lewis Point

Alternative G3 = Ferry Between Downtown and South of Airport

Alternative G4 = Ferry Between New Terminals Adjacent to Existing Ferry Terminals

4. THE PREFERRED ALTERNATIVE (F1)

Based on the analyses of alternatives, the project team has identified F1 as the Preferred Alternative. The preliminary wetland impacts along the preferred alternative are shown on Sheets 2 through 15. As mentioned above, the F1 Alternative requires two bridges over Tongass Narrows and approximately 8 miles of new roadway. Typical cross sections of the roadway and bridges are found on Sheet 16.

Approximately 500,000 cubic yards of clean fill would be placed in approximately 103.3 acres of wetlands to construct the preferred alternative. The types of fill material needed have not yet been determined. In addition, a total of 14 bridge piers would be placed in Tongass Narrows (see Sheet 17).

5. WETLAND IMPACT MITIGATION

Federal regulations and guidelines associated with Section 404 of the Clean Water Act require that project proponents eliminate or reduce adverse impacts on wetlands by taking certain specific steps during project planning. These steps are as follows (emphasis added):

1. Design the project to *avoid adverse impacts*.
2. Incorporate measures to *minimize adverse impacts*.
3. Plan to *restore sites* that must be temporarily adversely affected by the project.
4. *Compensate for unavoidable adverse impacts* through preservation, restoration, or creation of wetlands.

Each of the steps listed above is to be implemented to the extent feasible before moving on to the next step. Together, these steps mitigate (i.e., lessen) the overall adverse effects of a project. Impact avoidance and minimization measures are discussed below.

Impact Avoidance

Suitable non-wetland (upland) alternatives could not be defined because of the extremely wet climate of southeastern Alaska; Ketchikan on average receives approximately 169" of precipitation annually. Nearly all lands in the general vicinity of the Ketchikan International Airport on Gravina Island are wetlands. Similar to Gravina Island, all alternative locations on Pennock Island would impact wetlands. Few areas with substantial uplands exist within the entire Tongass Narrows vicinity; therefore, substantial impacts on wetlands are nearly unavoidable by any alternative that includes much new road on land. Several upland areas do occur on Revillagigedo Island, but these areas tend to be steep slopes, where sufficient drainage occurs so wetlands have not developed. These areas are not practicable road locations. Total avoidance of wetlands with this project is unachievable.

Impact Minimization

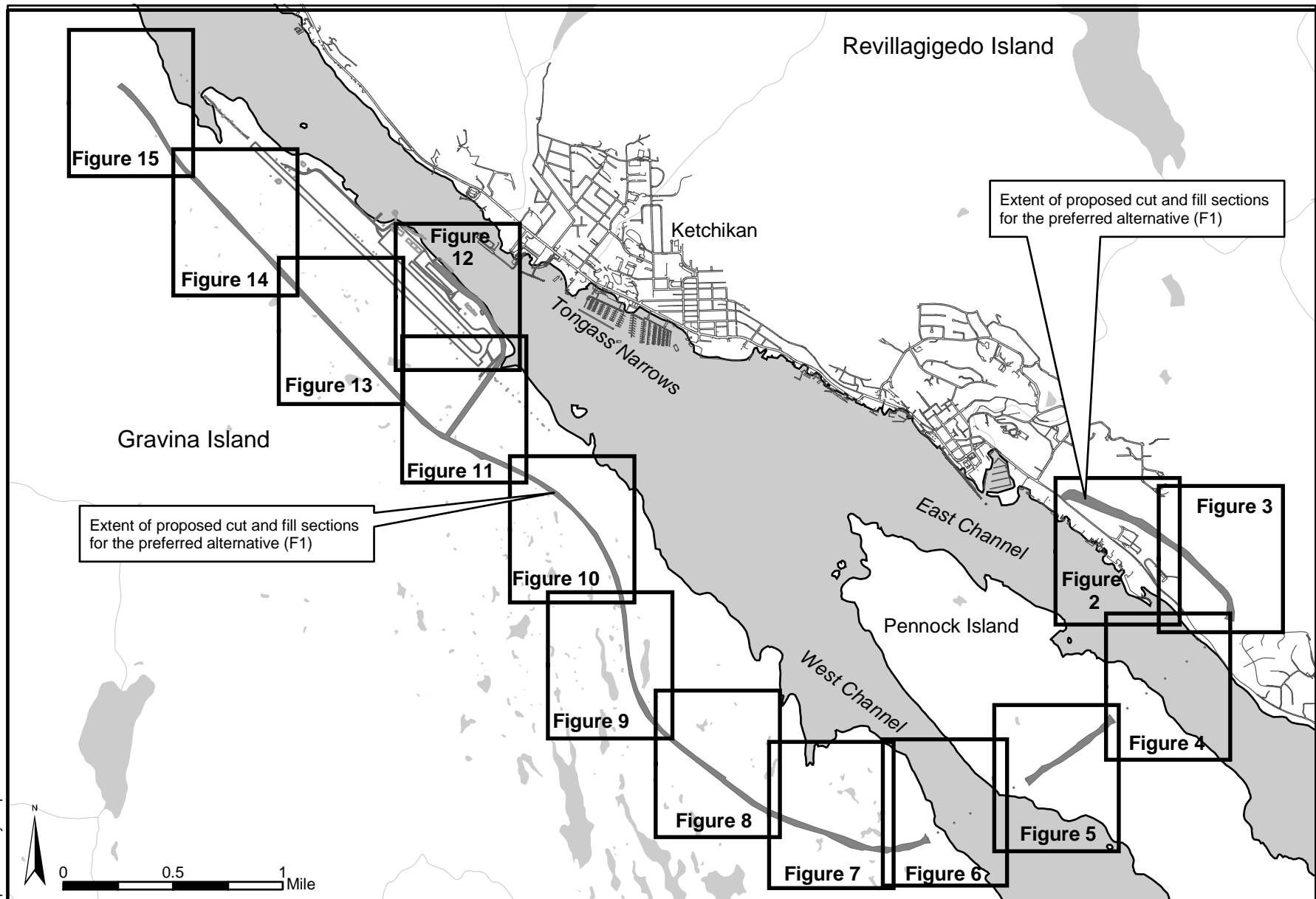
Bridges

- Bridges were located to avoid direct disturbance of the estuarine beach meadows and adjacent shorelines and river mouths.

Construction Methods

- Erosion and sedimentation control measures would be employed during construction and permanent measures would be employed as early in construction as possible.
- Only clean fill material would be used for the roadway embankment.

- Staking would be done at the planned outside limits of disturbance prior to construction to ensure that impacts are limited to that area.
- The roadway would be constructed using the minimum-width fill footprint necessary to provide a stable road base.
- The roadway would be constructed with a low-profile embankment to limit the fill footprint.
- Rock would be used to stabilize toes of slopes at ponds and stream crossings.
- Grass seed would be placed on road slopes. Topsoil would be applied to the surface of road slopes to aid in the reseeding process. To protect the integrity of the natural plant communities, plant species indigenous to the area would be used for vegetating road slopes, except that nonnative annual grasses may be used to provide initial soil cover.
- No clearing or grubbing would be done outside of fill footprint.
- Silt fences would be used adjacent to waterways just beyond the estimated toe of fill.
- Ditch checks would be used to reduce bank erosion during construction.
- Sedimentation basins would be used, as necessary, during construction.
- Roadside swales would be designed to keep surface water within the natural drainage basins.
- Culverts would be installed through fill slopes in appropriate locations to maintain natural flow patterns for surface water.



PURPOSE: To improve surface transportation for vehicles, bicyclists, and pedestrians between Revillagigedo Island and Gravina Island.

LOCATION:
 T. 75S R. 090E SEC. 16, 22, 23, 26, 27, 35, 36
 T. 76S R. 090E SEC. 01
 T. 75S R. 091E SEC. 29, 30, 31, 32
 T. 76S R. 091E SEC. 06
 Copper River Meridian

**PREFERRED ALTERNATIVE
(F1)**

SHEET EXTENTS

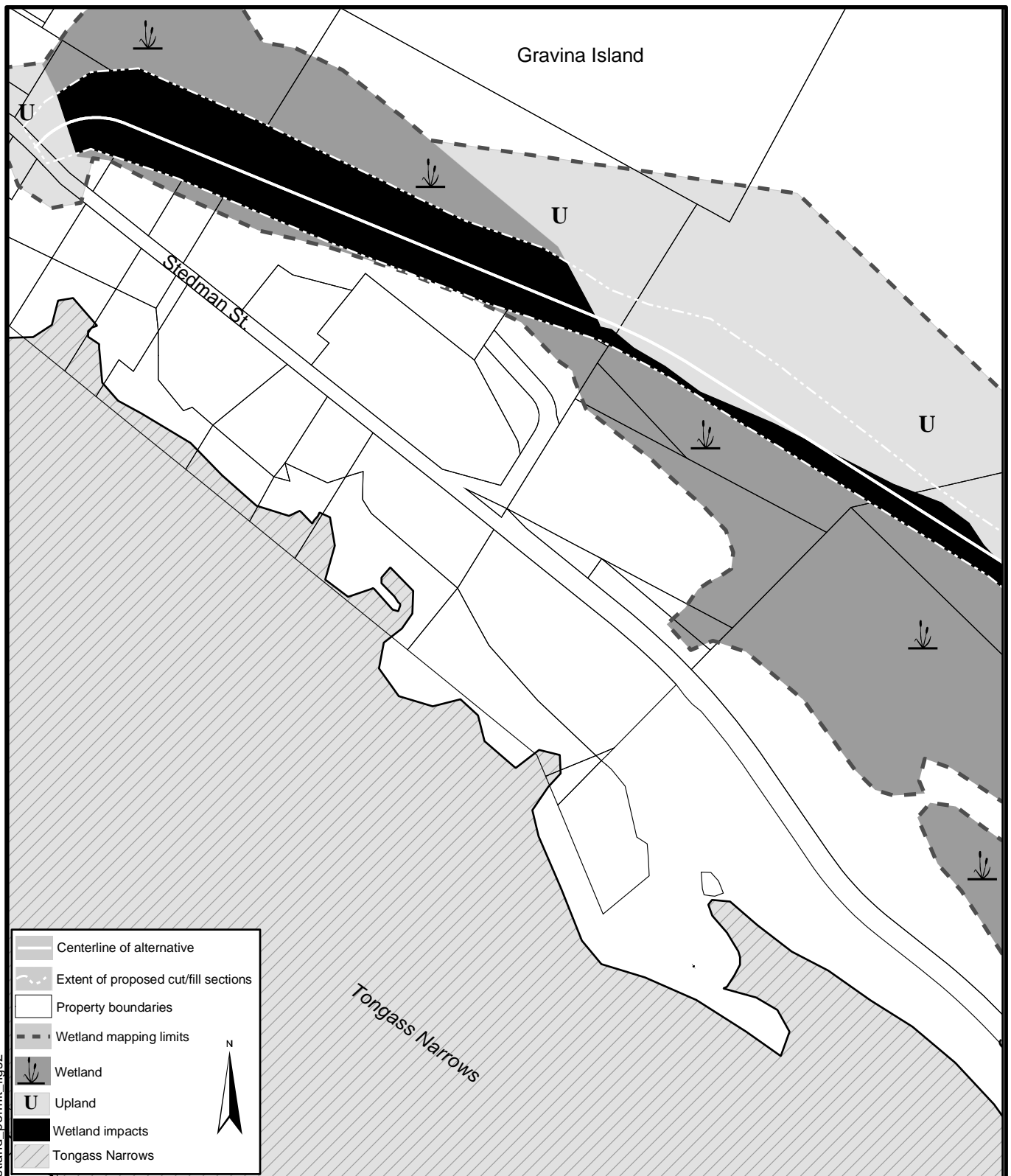
APPLICATION BY:
 State of Alaska
 Department of Transportation and Public Facilities
 6860 Glacier Highway
 Juneau, AK 99801-7999

GRAVINA ACCESS PROJECT

IN: TONGASS NARROWS
 AT: KETCHIKAN, ALASKA

Date: 5-30-03

SHEET 1 of 17



PURPOSE: To improve surface transportation for vehicles, bicyclists, and pedestrians between Revillagigedo Island and Gravina Island.

ADJACENT PROPERTY OWNERS:
SEE ATTACHED SHEETS

LOCATION:
T. 75S R. 090E SEC. 16, 22, 23, 26, 27, 35, 36
T. 76S R. 090E SEC. 01
T. 75S R. 091E SEC. 29, 30, 31, 32
T. 76S R. 091E SEC. 06
Copper River Meridian

WETLAND IMPACTS ALONG PREFERRED ALTERNATIVE

(F1)

SCALE 1" = 400'

APPLICATION BY:

State of Alaska Department of Transportation and Public Facilities
6860 Glacier Highway
Juneau, AK 99801-7999

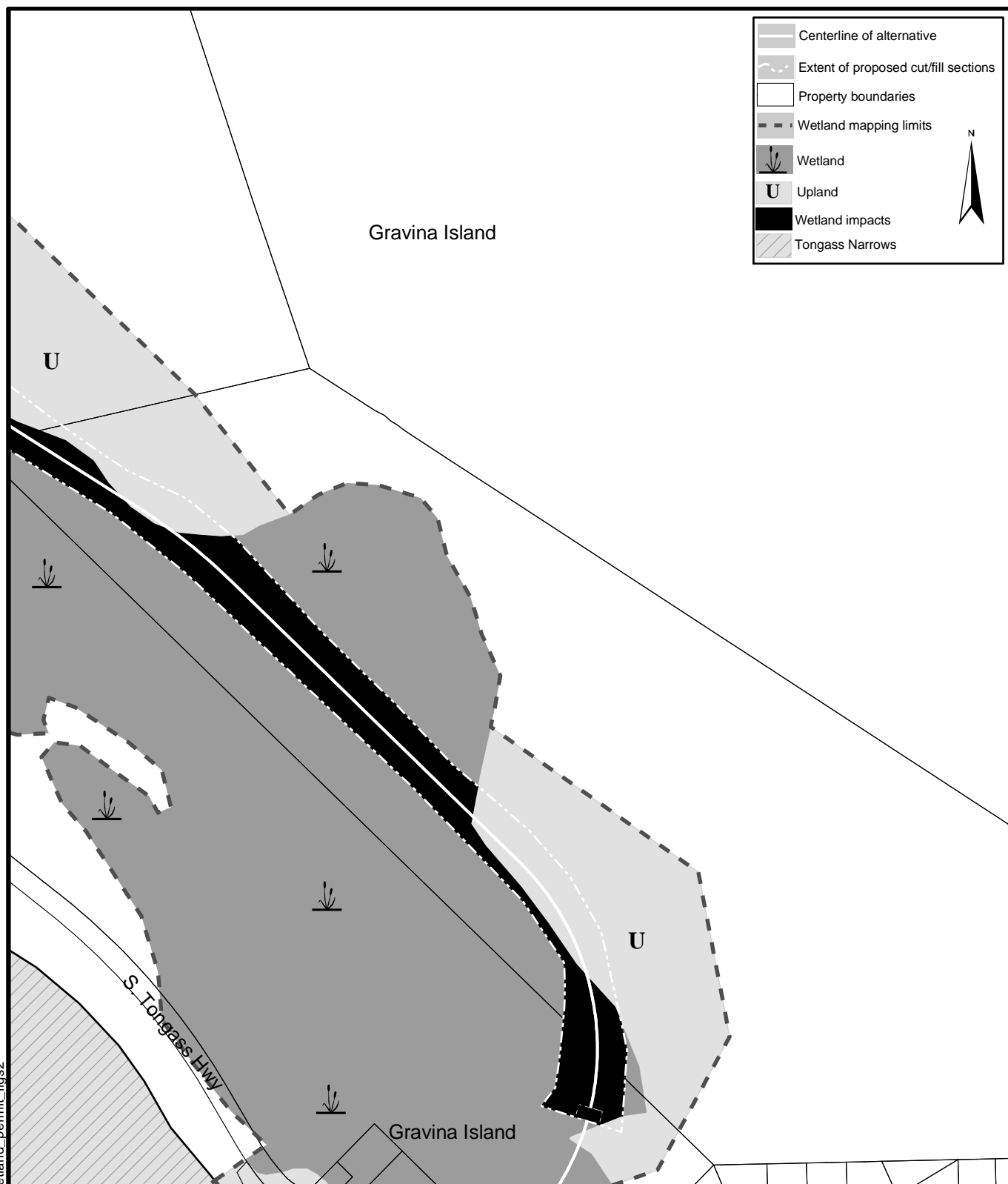
GRAVINA ACCESS PROJECT

IN: TONGASS NARROWS

AT: KETCHIKAN, ALASKA

Date: 5-30-03

SHEET 2 of 17



PURPOSE: To improve surface transportation for vehicles, bicyclists, and pedestrians between Revillagigedo Island and Gravina Island.

ADJACENT PROPERTY OWNERS:
SEE ATTACHED SHEETS

LOCATION:
T. 75S R. 090E SEC. 16, 22, 23, 26, 27, 35, 36
T. 76S R. 090E SEC. 01
T. 75S R. 091E SEC. 29, 30, 31, 32
T. 76S R. 091E SEC. 06
Copper River Meridian

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Juneau, AK 99801-7999

GRAVINA ACCESS PROJECT

IN: TONGASS NARROWS

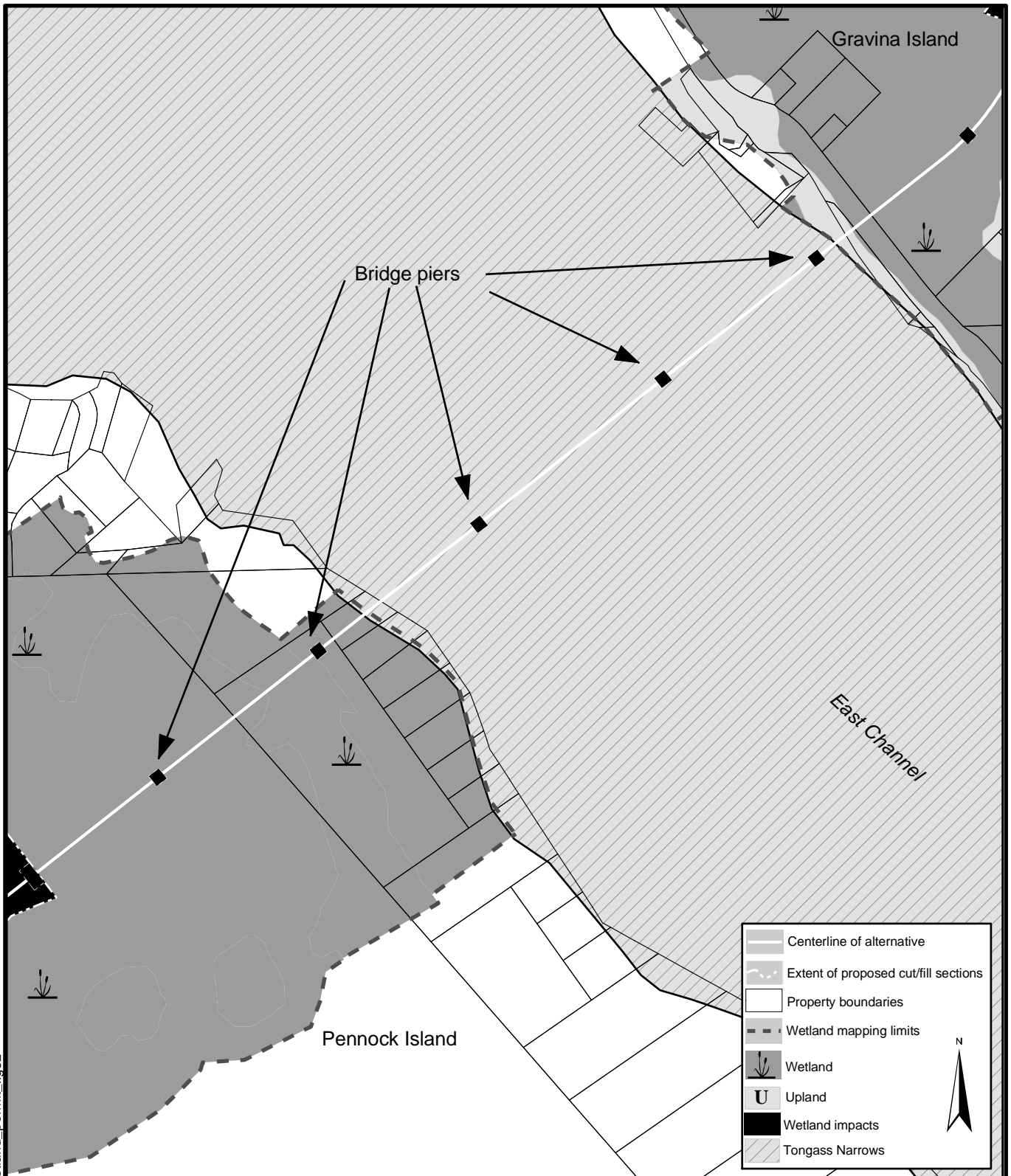
AT: KETCHIKAN, ALASKA

Date: 5-30-03

SHEET 3 of 17

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PURPOSE: To improve surface transportation for vehicles, bicyclists, and pedestrians between Revillagigedo Island and Gravina Island.

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Copper River Meridian

WETLAND IMPACTS ALONG PREFERRED ALTERNATIVE

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State of Alaska Department of Transportation and Public Facilities
6860 Glacier Highway
Juneau, AK 99801-7999

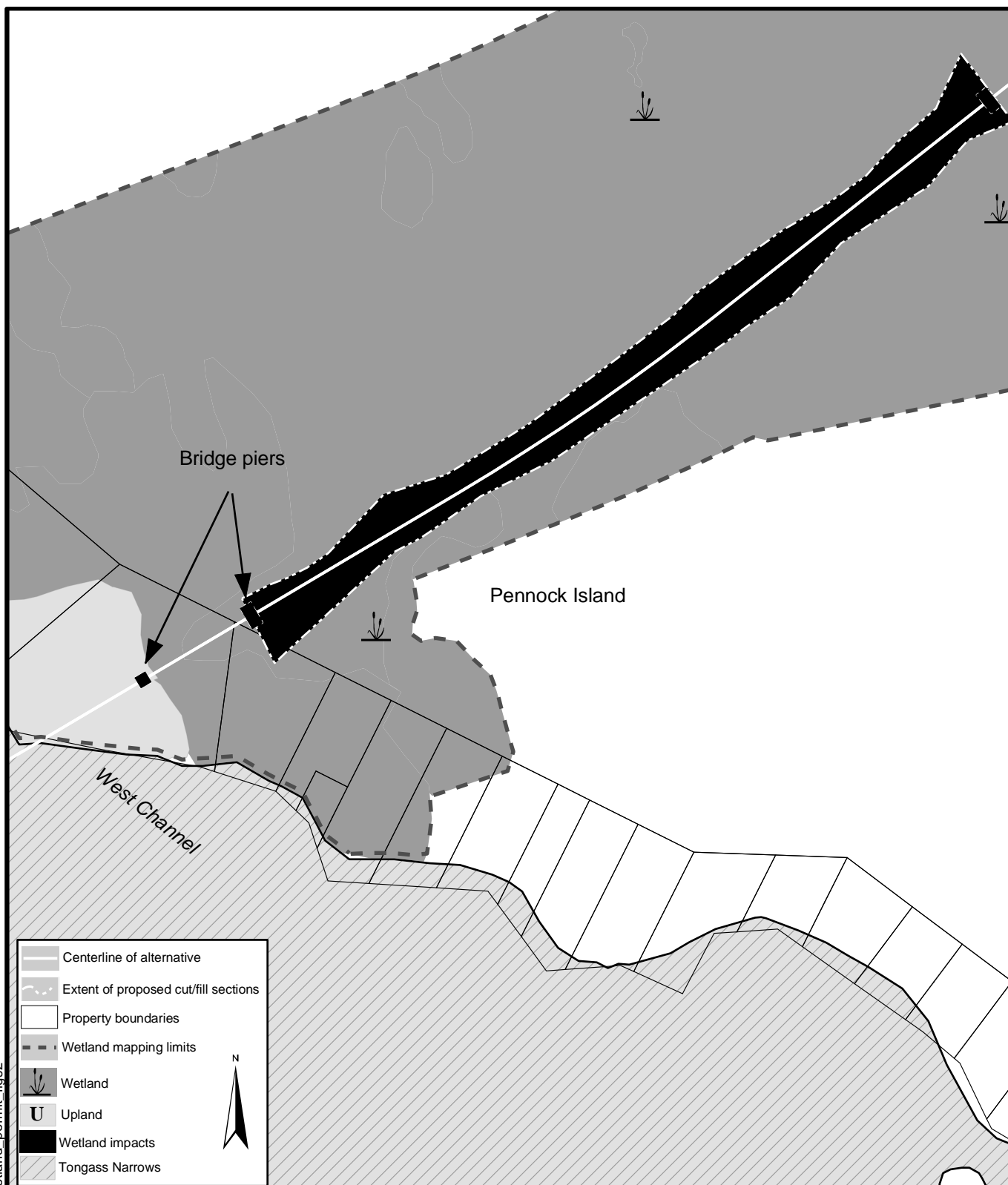
GRAVINA ACCESS PROJECT

IN: TONGASS NARROWS

AT: KETCHIKAN, ALASKA

Date: 5-30-03

SHEET 4 of 17



PURPOSE: To improve surface transportation for vehicles, bicyclists, and pedestrians between Revillagigedo Island and Gravina Island.

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Copper River Meridian

WETLAND IMPACTS ALONG PREFERRED ALTERNATIVE

(F1)

SCALE 1" = 400'

APPLICATION BY:

State of Alaska Department of Transportation and Public Facilities
6860 Glacier Highway
Juneau, AK 99801-7999

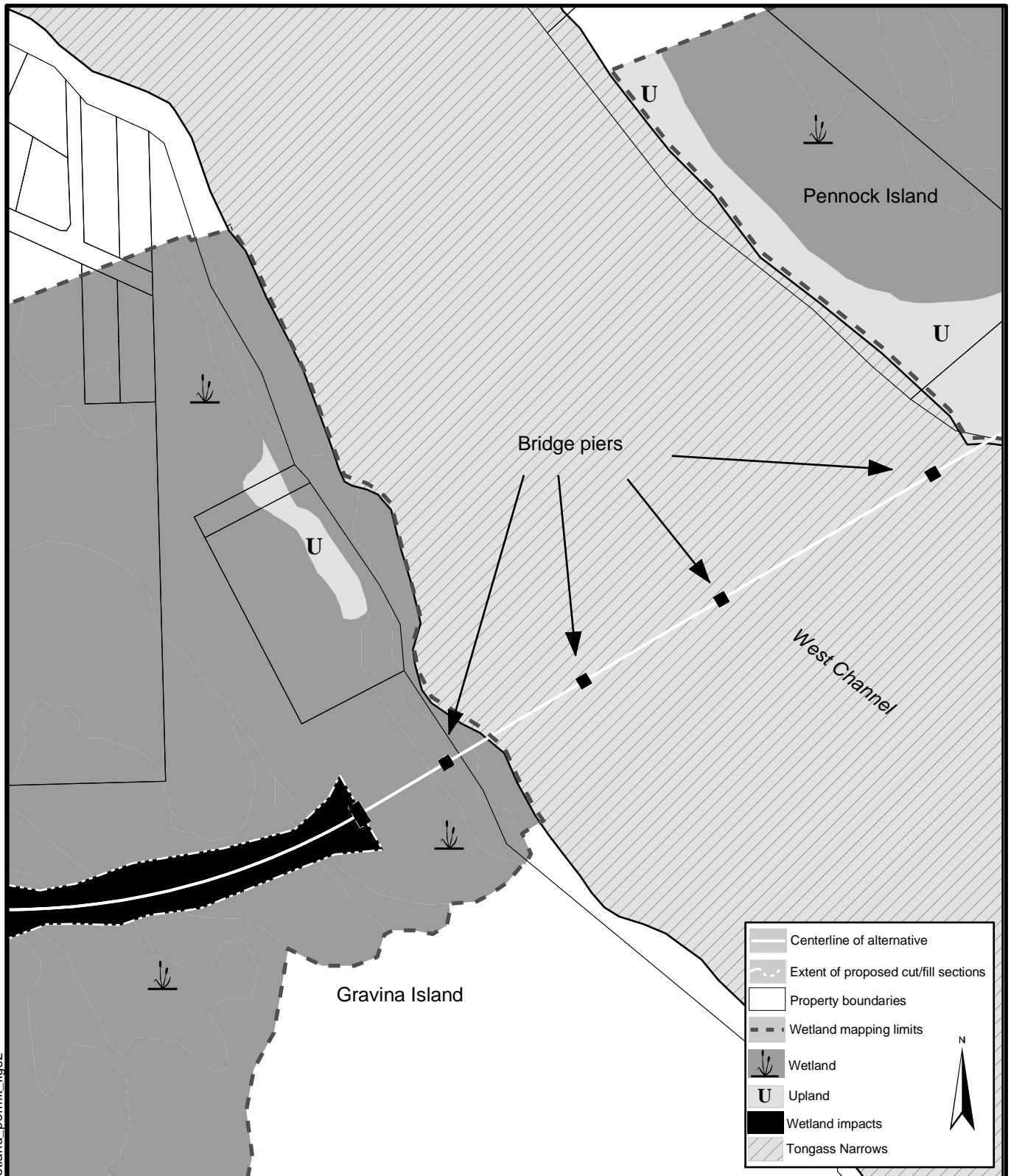
GRAVINA ACCESS PROJECT

IN: TONGASS NARROWS

AT: KETCHIKAN, ALASKA

Date: 5-30-03

SHEET 5 of 17



PURPOSE: To improve surface transportation for vehicles, bicyclists, and pedestrians between Revillagigedo Island and Gravina Island.

ADJACENT PROPERTY OWNERS:
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LOCATION:
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Copper River Meridian

WETLAND IMPACTS ALONG PREFERRED ALTERNATIVE

(F1)

SCALE 1" = 400'

APPLICATION BY:

State of Alaska Department of Transportation and Public Facilities
6860 Glacier Highway
Juneau, AK 99801-7999

GRAVINA ACCESS PROJECT

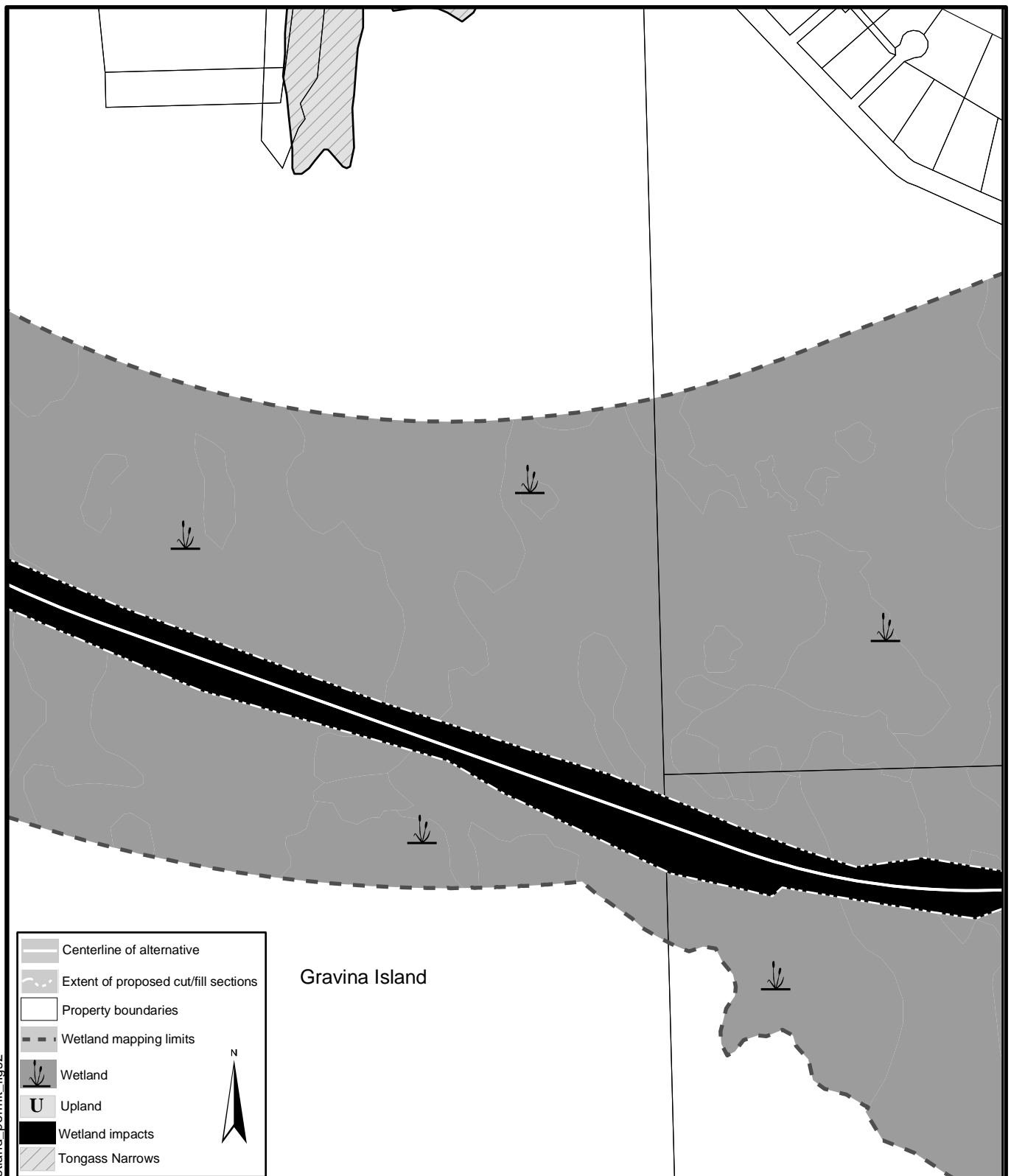
IN: TONGASS NARROWS

AT: KETCHIKAN, ALASKA

Date: 5-30-03

SHEET 6 of 17

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PURPOSE: To improve surface transportation for vehicles, bicyclists, and pedestrians between Revillagigedo Island and Gravina Island.

ADJACENT PROPERTY OWNERS:
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LOCATION:
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T. 76S R. 091E SEC. 06
Copper River Meridian

WETLAND IMPACTS ALONG PREFERRED ALTERNATIVE

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SCALE 1" = 400'

APPLICATION BY:

State of Alaska Department of Transportation and Public Facilities
6860 Glacier Highway
Juneau, AK 99801-7999

GRAVINA ACCESS PROJECT

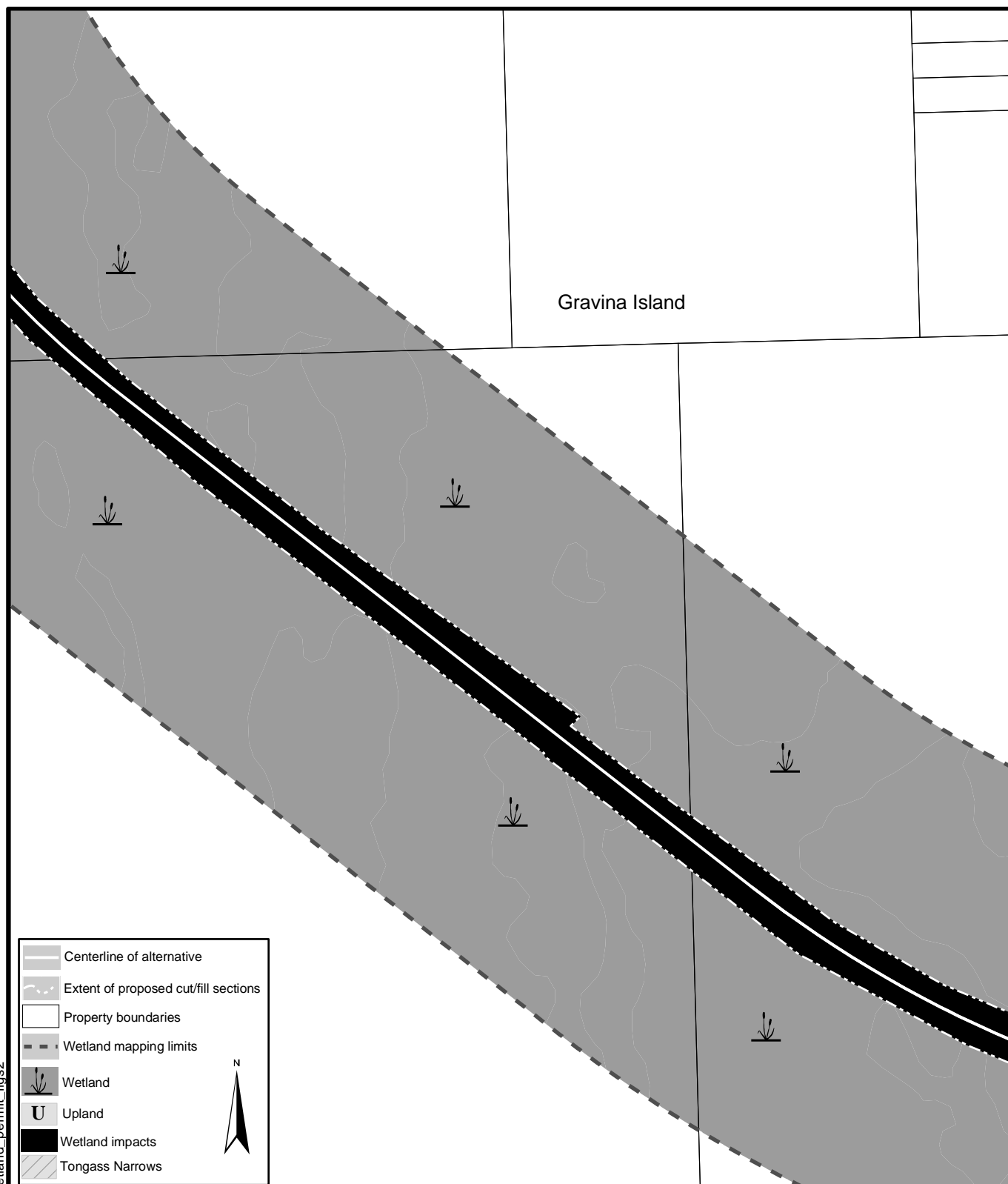
IN: TONGASS NARROWS

AT: KETCHIKAN, ALASKA

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SHEET 7 of 17

File:x:\gisdata\gravina_eis\permits\wetland_permit_figs2



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ADJACENT PROPERTY OWNERS:
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Copper River Meridian

WETLAND IMPACTS ALONG PREFERRED ALTERNATIVE

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6860 Glacier Highway
Juneau, AK 99801-7999

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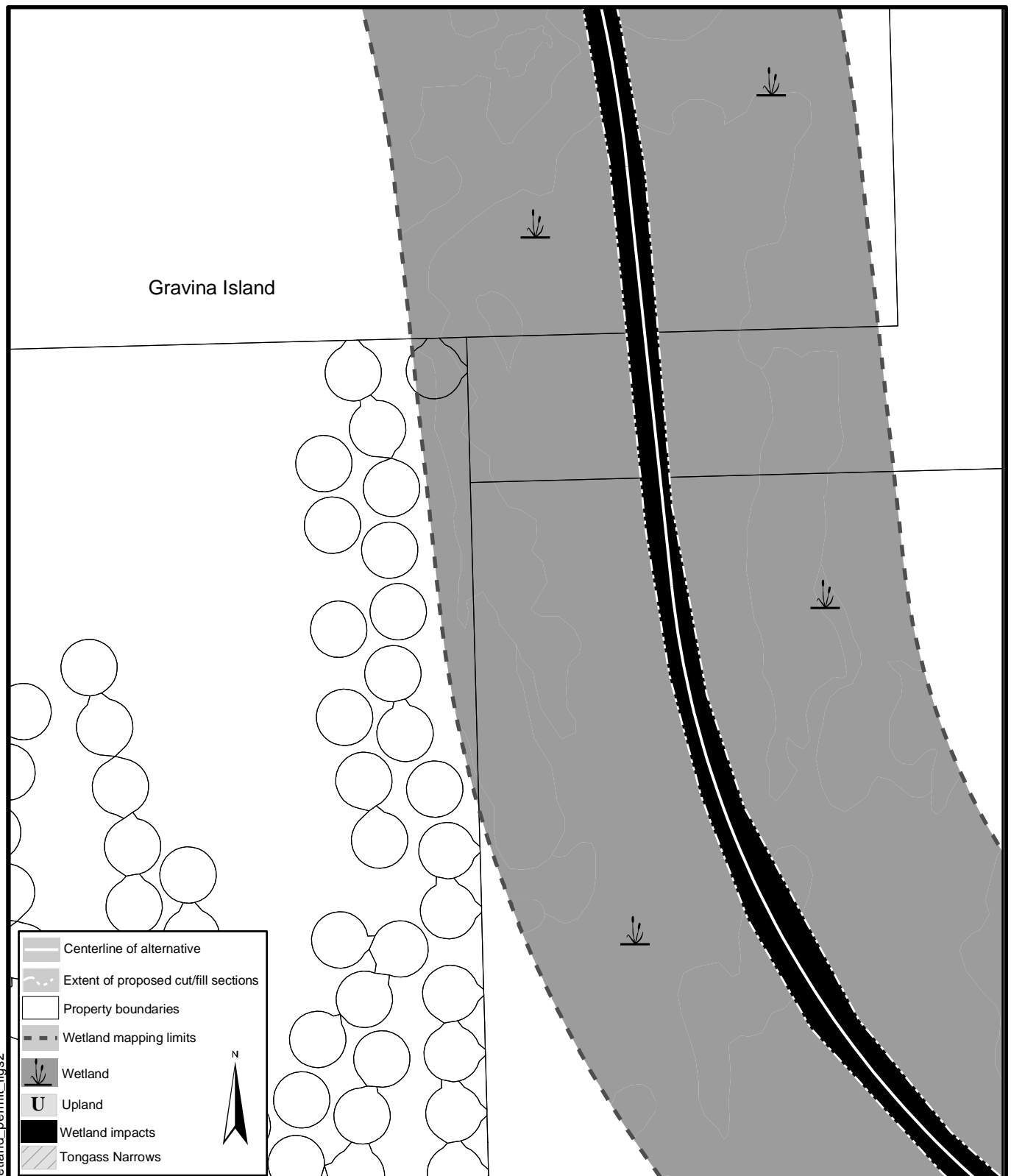
IN: TONGASS NARROWS

AT: KETCHIKAN, ALASKA

Date: 5-30-03

SHEET 8 of 17

File:x:\gisdata\gravina_eis\permits\wetland_permit_fig2



PURPOSE: To improve surface transportation for vehicles, bicyclists, and pedestrians between Revillagiedo Island and Gravina Island.

ADJACENT PROPERTY OWNERS:
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LOCATION:
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Copper River Meridian

WETLAND IMPACTS ALONG PREFERRED ALTERNATIVE

(F1)

SCALE 1" = 400'

APPLICATION BY:

State of Alaska Department of Transportation and Public Facilities
6860 Glacier Highway
Juneau, AK 99801-7999

GRAVINA ACCESS PROJECT

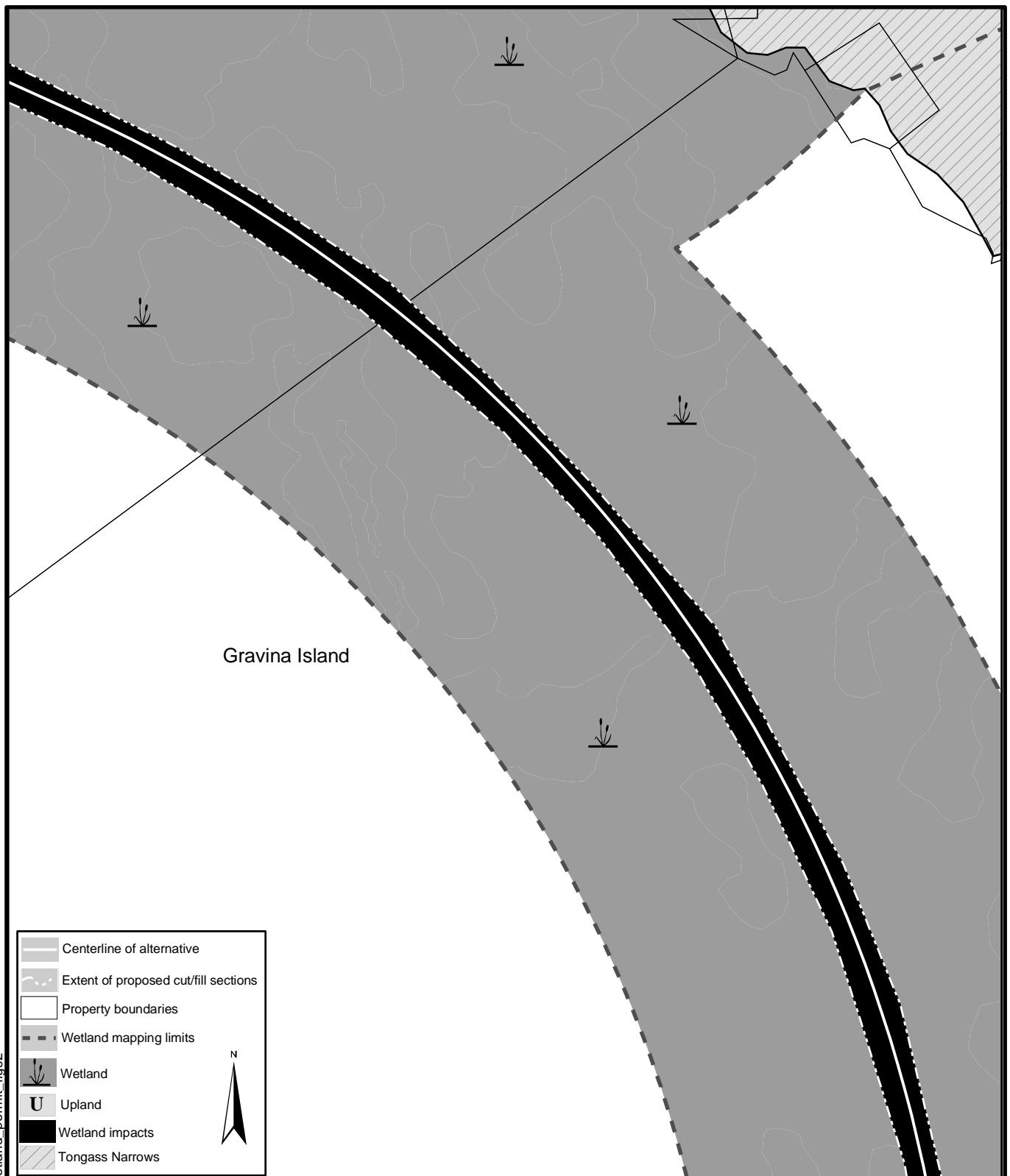
IN: TONGASS NARROWS

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SHEET 9 of 17

File:x:\gisdata\gravina_eis\permits\wetland_permit_figs2



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Copper River Meridian

WETLAND IMPACTS ALONG PREFERRED ALTERNATIVE

(F1)

SCALE 1" = 400'

APPLICATION BY:

State of Alaska Department of Transportation and Public Facilities
6860 Glacier Highway
Juneau, AK 99801-7999

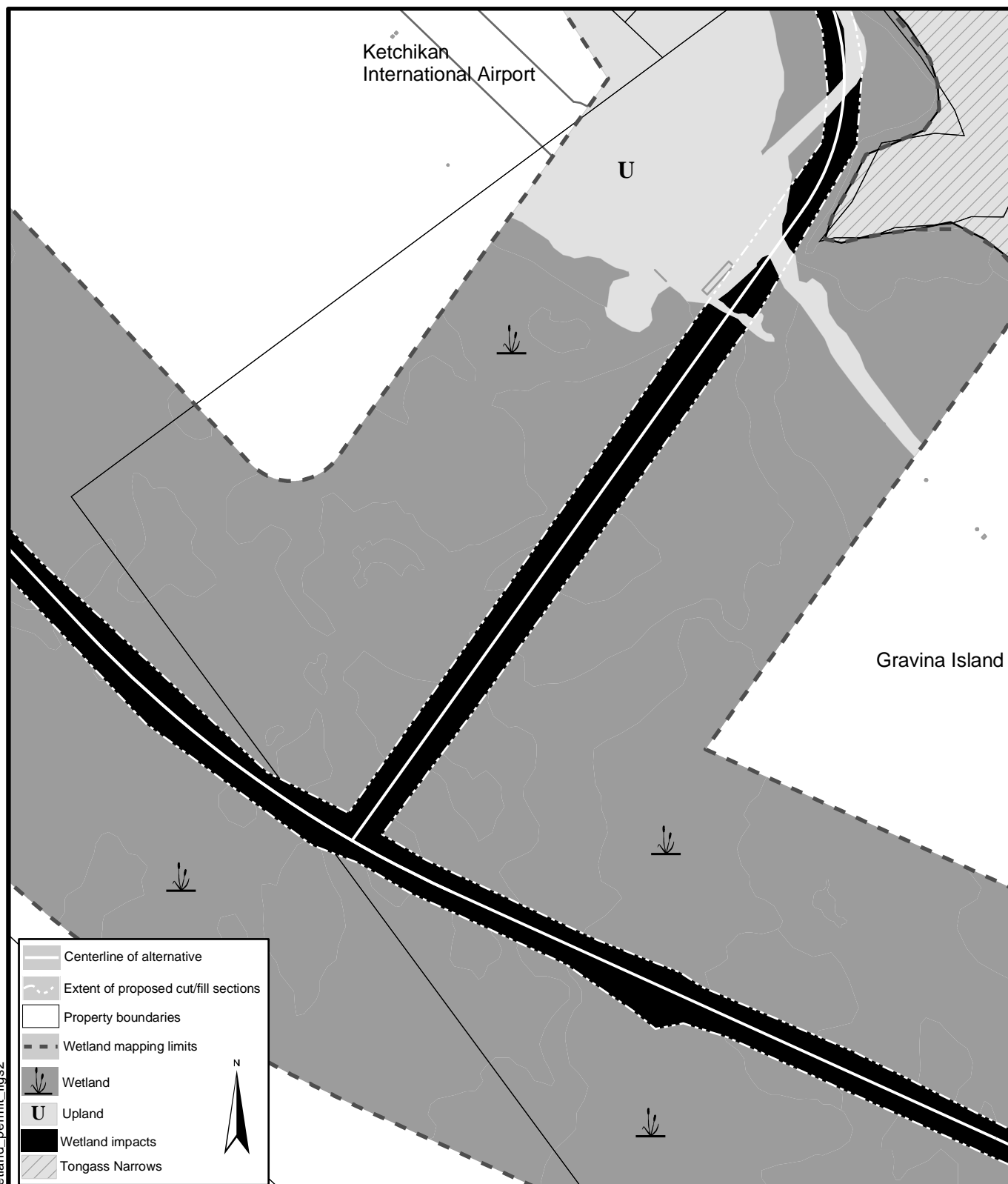
GRAVINA ACCESS PROJECT

IN: TONGASS NARROWS

AT: KETCHIKAN, ALASKA

Date: 5-30-03

SHEET 10 of 17



PURPOSE: To improve surface transportation for vehicles, bicyclists, and pedestrians between Revillagigedo Island and Gravina Island.

ADJACENT PROPERTY OWNERS:
SEE ATTACHED SHEETS

LOCATION:
T. 75S R. 090E SEC. 16, 22, 23, 26, 27, 35, 36
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Copper River Meridian

WETLAND IMPACTS ALONG PREFERRED ALTERNATIVE

(F1)

SCALE 1" = 400'

APPLICATION BY:

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6860 Glacier Highway
Juneau, AK 99801-7999

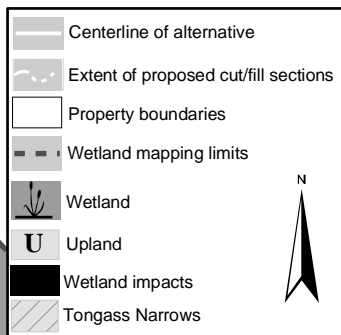
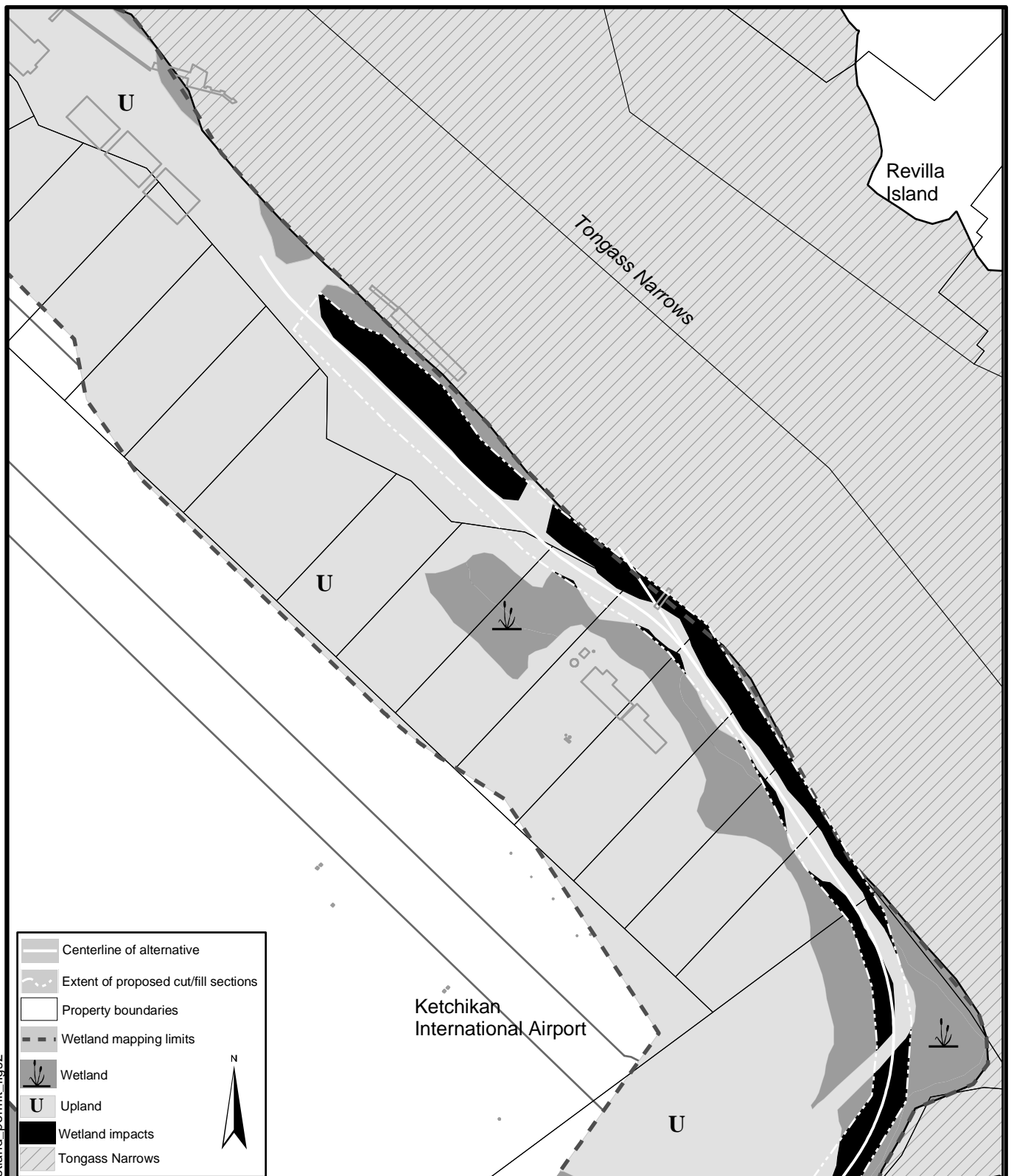
GRAVINA ACCESS PROJECT

IN: TONGASS NARROWS

AT: KETCHIKAN, ALASKA

Date: 5-30-03

SHEET 11 of 17



PURPOSE: To improve surface transportation for vehicles, bicyclists, and pedestrians between Revillagiedo Island and Gravina Island.

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T. 75S R. 090E SEC. 16, 22, 23, 26, 27, 35, 36
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Copper River Meridian

WETLAND IMPACTS ALONG PREFERRED ALTERNATIVE (F1)

SCALE 1" = 400'

APPLICATION BY:

State of Alaska Department of Transportation and Public Facilities
6860 Glacier Highway
Juneau, AK 99801-7999

GRAVINA ACCESS PROJECT

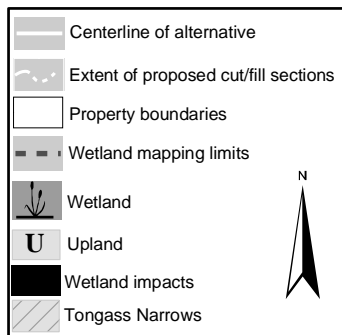
IN: TONGASS NARROWS

AT: KETCHIKAN, ALASKA

Date: 5-30-03

SHEET 12 of 17

Ketchikan
International Airport



PURPOSE: To improve surface transportation for vehicles, bicyclists, and pedestrians between Revillagigedo Island and Gravina Island.

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Copper River Meridian

WETLAND IMPACTS ALONG PREFERRED ALTERNATIVE

(F1)

SCALE 1" = 400'

APPLICATION BY:

State of Alaska Department of Transportation and Public Facilities
6860 Glacier Highway
Juneau, AK 99801-7999

GRAVINA ACCESS PROJECT

IN: TONGASS NARROWS

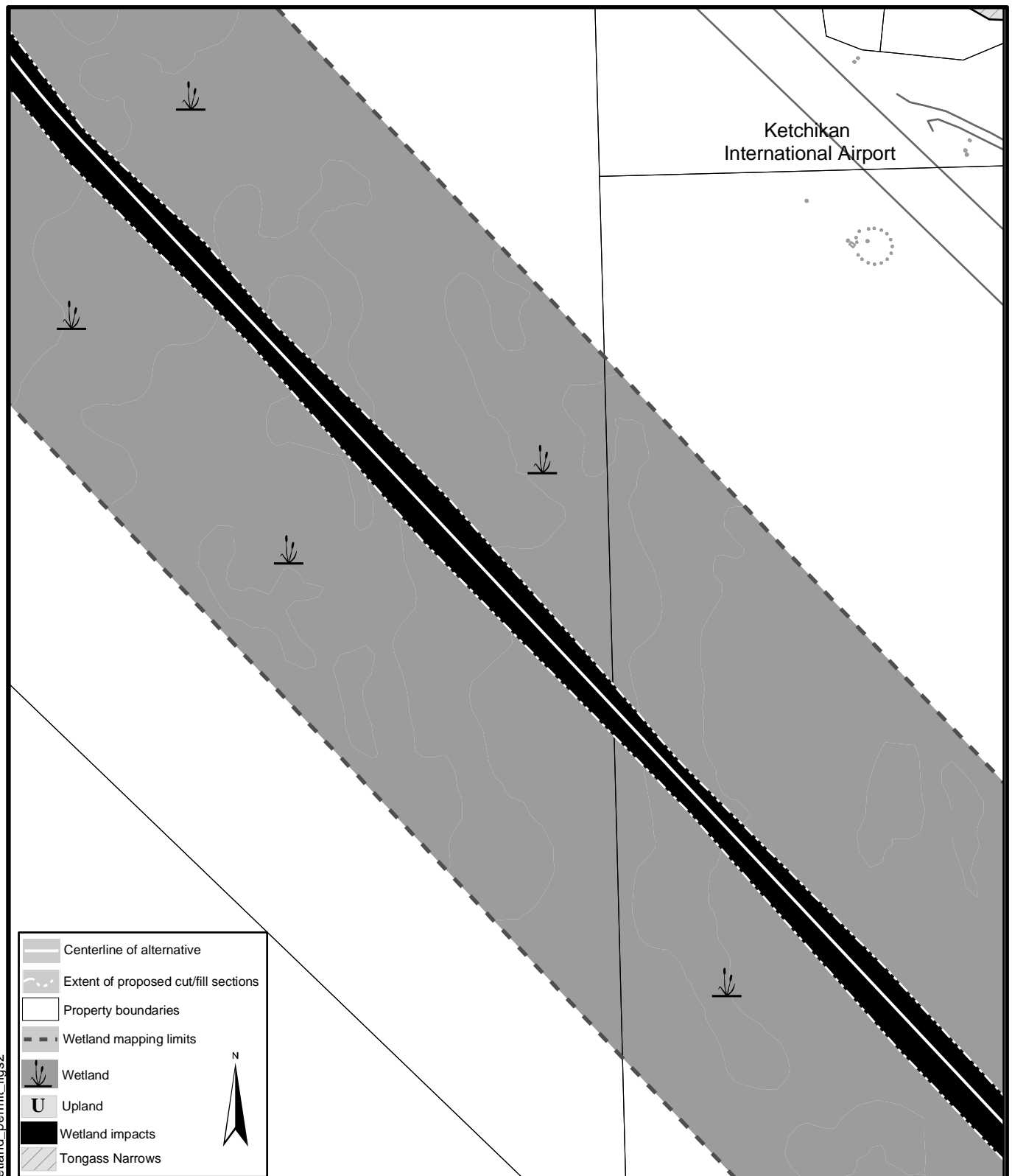
AT: KETCHIKAN, ALASKA

Date: 5-30-03

SHEET 13 of 17

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PURPOSE: To improve surface transportation for vehicles, bicyclists, and pedestrians between Revillagigedo Island and Gravina Island.

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T. 76S R. 091E SEC. 06
Copper River Meridian

WETLAND IMPACTS ALONG PREFERRED ALTERNATIVE

(F1)

SCALE 1" = 400'

APPLICATION BY:

State of Alaska Department of Transportation and Public Facilities
6860 Glacier Highway
Juneau, AK 99801-7999

GRAVINA ACCESS PROJECT

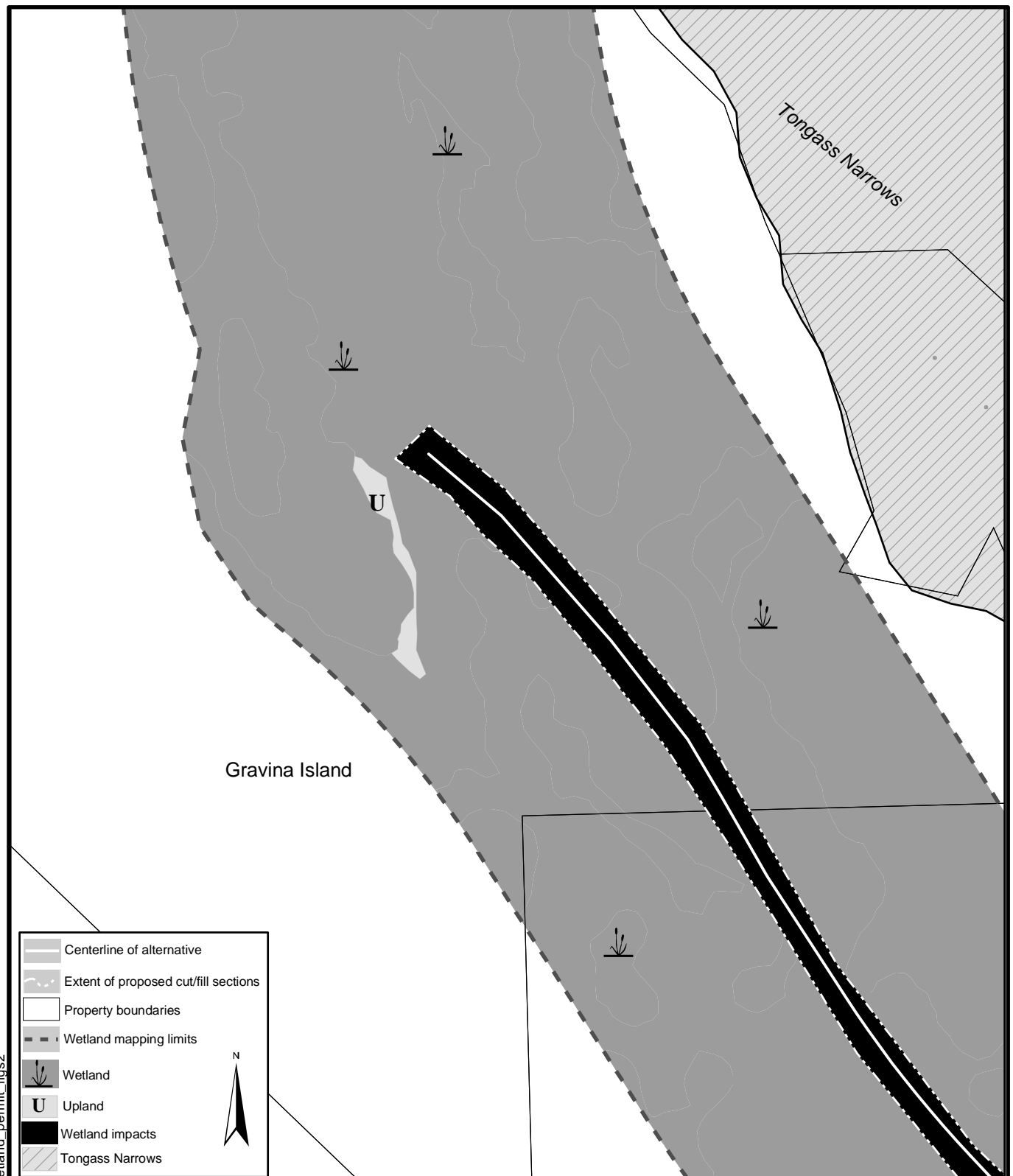
IN: TONGASS NARROWS

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Date: 5-30-03

SHEET 14 of 17

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PURPOSE: To improve surface transportation for vehicles, bicyclists, and pedestrians between Revillagigedo Island and Gravina Island.

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Copper River Meridian

WETLAND IMPACTS ALONG PREFERRED ALTERNATIVE

(F1)

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APPLICATION BY:

State of Alaska Department of Transportation and Public Facilities
6860 Glacier Highway
Juneau, AK 99801-7999

GRAVINA ACCESS PROJECT

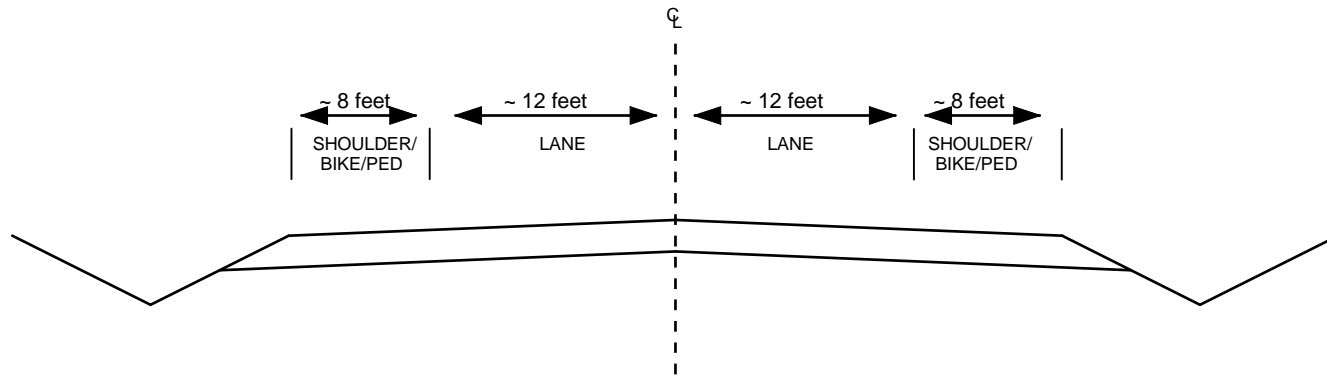
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Date: 5-30-03

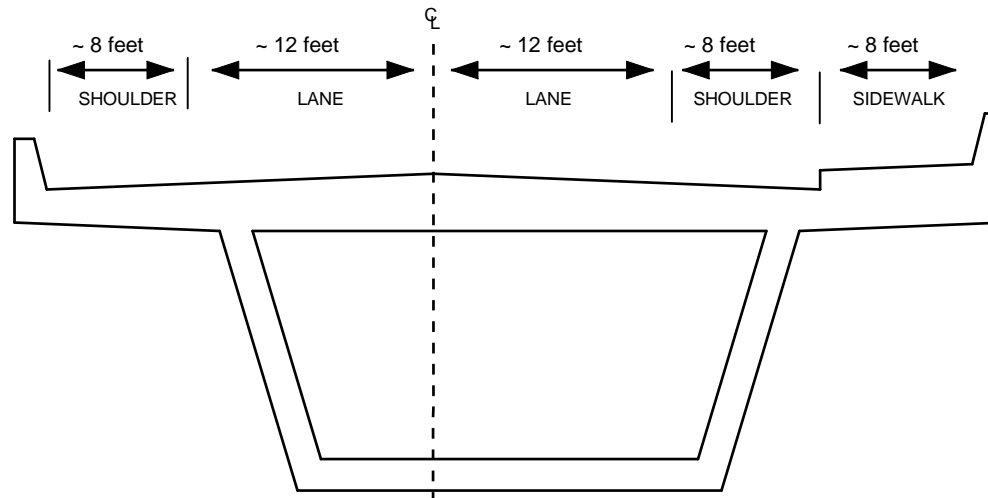
SHEET 15 of 17

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TYPICAL ROADWAY SECTION

NTS



TYPICAL BRIDGE SECTION

NTS

PURPOSE: To improve surface transportation for vehicles, bicyclists, and pedestrians between Revillagigedo Island and Gravina Island.

LOCATION:

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T. 76S R. 091E SEC. 06
Copper River Meridian

**PREFERRED ALTERNATIVE
(F1)**

Typical Roadway and Bridge Sections

APPLICATION BY:
State of Alaska
Department of Transportation and Public Facilities
6860 Glacier Highway
Juneau, AK 99801-7999

GRAVINA ACCESS PROJECT

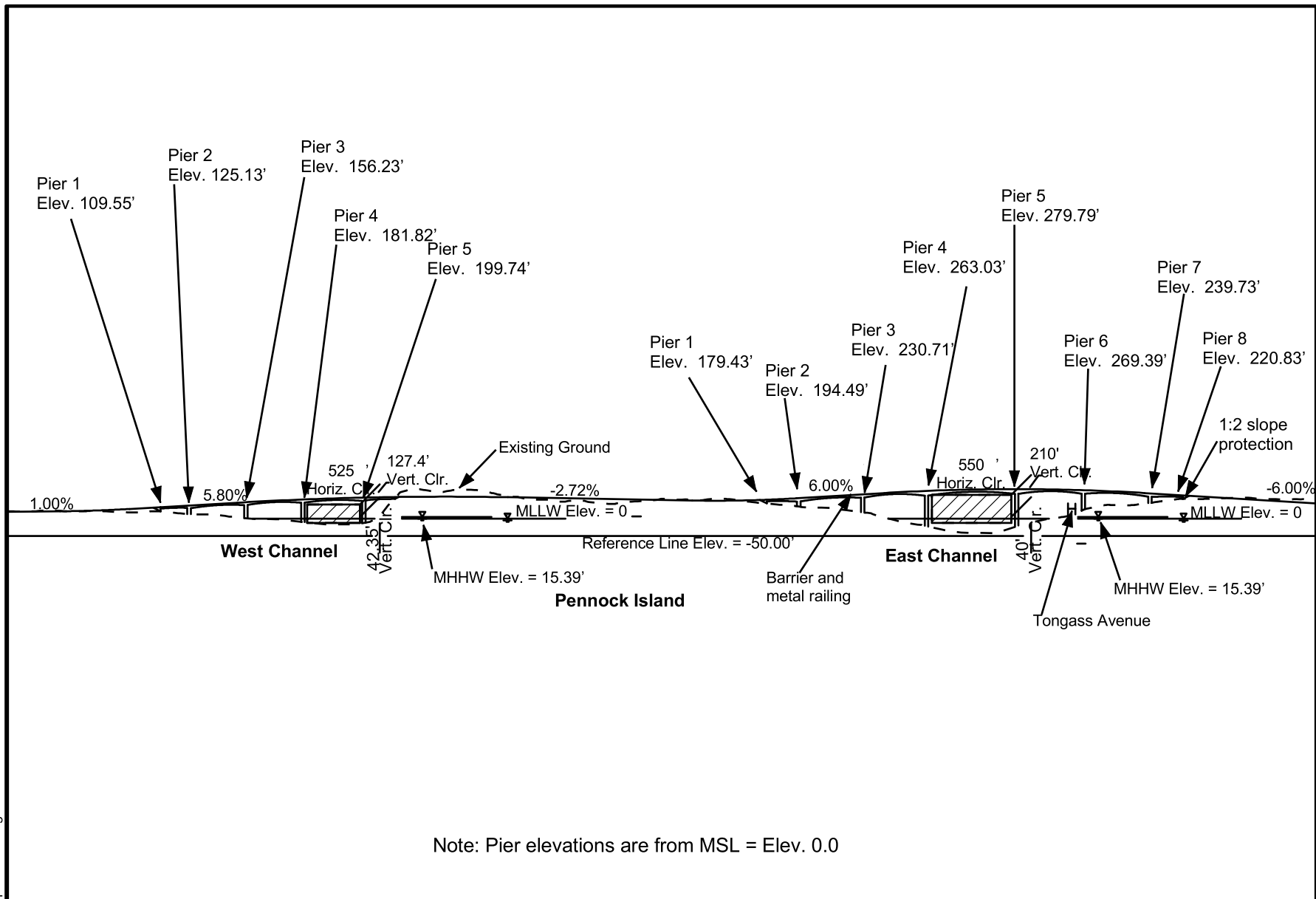
IN: TONGASS NARROWS

AT: KETCHIKAN, ALASKA

Date: 5-30-03

SHEET 16 of 17

File: x:\gisdata\Gravina_EIS\permits\bridge.mxd



Note: Pier elevations are from MSL = Elev. 0.0

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Copper River Meridian

**PREFERRED ALTERNATIVE
(F1)**

Elevation View of Bridges

APPLICATION BY:
State of Alaska
Department of Transportation and Public Facilities
6860 Glacier Highway
Juneau, AK 99801-7999

GRAVINA ACCESS PROJECT

IN: TONGASS NARROWS
AT: KETCHIKAN, ALASKA

Date: 5-30-03

SHEET 17 of 17

Gravina Access Project
Adjacent Property Owners for the Preferred Alternative (F1)

Owner	Owner2	Address	City	ZipCode
AIRPORT BAR & RESTAURANT	SALAZAR MIKE & BARBARA - LESSEE	PO BOX 6918	KETCHIKAN, AK	99901
ALASKA AIRLINES INC	ATTN PROPERTY TAX ADMIN	PO BOX 68900	SEATTLE WA	98168
ALASKA CAR RENTAL		2828 TONGASS AVE	KETCHIKAN, AK	99901
ALASKA GENERAL SEAFOOD		PO BOX 5240	KETCHIKAN, AK	99901
ALASKA GENERAL SEAFOODS		6425 NE 175TH ST	KENMORE WA	98028
ALASKA MENTAL HEALTH TRUST AUTHORIT	C/O TRUST LAND OFFICE	550 W 7TH AVE # 1820	ANCHORAGE, AK	99501
ALLEN YVONETTE T		3013 FORSS AVE	KETCHIKAN, AK	99901
ALMQUIST ALLAN & ANDERSON LORNA		308 DEERMOUNT ST	KETCHIKAN, AK	99901
BARTHOLOMEW ERMA M		313 MADISON	KETCHIKAN, AK	99901
BOLLING CECILIA R	BOLLING WALTER B	PO BOX 5958	KETCHIKAN, AK	99901
BRANDA CHARLES V		752 FOREST PARK DR	KETCHIKAN, AK	99901
BURGHDIFF BRYAN & BERNICE		PO BOX 6462	KETCHIKAN, AK	99901
C & E ANDERES OIL COMPANY		PO BOX 5858	KETCHIKAN, AK	99901
CARLSEN AUDREY & LANE FRANK E		PO BOX 7761	KETCHIKAN, AK	99901
CHAMBERS HERBERT E & E BARBARA		4468 S TONGASS HWY	KETCHIKAN, AK	99901
CITY OF KETCHIKAN		334 FRONT STREET	KETCHIKAN, AK	99901
CITY OF SAXMAN		PO BOX 8676	KETCHIKAN, AK	99901
CONLEY WILFORD & BONNIE		771 FOREST PARK DR	KETCHIKAN, AK	99901
CP INC		625 STEDMAN ST	KETCHIKAN, AK	99901
DILLON SHARON		PO BOX 7404	KETCHIKAN, AK	99901
DOYON DAVID P	DBA MISTY FJORDS AIR & OUTFITTING	1716 S TONGASS HWY	KETCHIKAN, AK	99901
DOYON DAVID P/DBA MISTY FJORDS AIR	STATE OF ALASKA - LESSOR	1716 S TONGASS HWY	KETCHIKAN, AK	99901
GERMAIN BETTY JEAN &	GERMAIN JERRY CHARLES	PO BOX 8216	KETCHIKAN, AK	99901
GOODALE WILLIAM C		PO BOX 5503	KETCHIKAN, AK	99901
HALL RONALD & DOROTHY		80312 HWY 99	COTTAGE GROVE OR	97424
HARVEY VIRGENE & KELLOG HILL RUTH		808 FOREST PARK DR	KETCHIKAN, AK	99901
HILL MARVIN LEE & RUTH KELLOGG-HILL		808 FOREST PARK DR	KETCHIKAN, AK	99901
HUSSMAN WILLIAM P & ANNITA C		PO BOX 927	DONNELLY ID	83615
JEROME ALASKA LLC	C/O SPEARS MANUFACTURING CO	15853 OLDEN ST	SYLMAR CA	91392
KAMM CLIFFORD S & LORI B		PO BOX 9172	KETCHIKAN, AK	99901
KEENE HENRY C JR & JEAN B		2051 SEA LEVEL DR #305	KETCHIKAN, AK	99901
KETCHIKAN GATEWAY BOROUGH		344 FRONT STREET	KETCHIKAN, AK	99901
KLEINSCHMIDT KENT		PO BOX 7778	KETCHIKAN, AK	99901
LAWRENCE VALORIE J &	FLETCHER MICHAEL	PO BOX 5904	KETCHIKAN, AK	99901
LEWIS MOTORS	DBA PAYLESS CAR RENTAL	4950 N TONGASS HWY	KETCHIKAN, AK	99901
LOWELL DONALD G & FRANCES J		PO BOX 7524	KETCHIKAN, AK	99901
MADSEN GERALD		16605 32ND SOUTH	SEATTLE WA	98188
MCCORMICK G R & ALICE J		PO BOX 6394	KETCHIKAN, AK	99901
MICKEL EARL E & E JANENE		PO BOX 1977	BEACH LAKE PA	18405
MORAN MICHAEL & JUDY	JUDY'S GIFT CACHE	PO BOX 7116	KETCHIKAN, AK	99901
MOULTON STEVE & ROBYN L		PO BOX 9299	KETCHIKAN, AK	99901
NICKICH DONALD L JR & DOROTHY		784 FOREST PARK DR	KETCHIKAN, AK	99901
NORTHLAND SERVICES INC		PO BOX 24527 SUITE C	SEATTLE WA	98124
PARKVIEW APARTMENT COMPANY	CAFFREY TOM & DOREEN (OFFICER	PO BOX 6215	KETCHIKAN, AK	99901
PETRO ALASKA INC		PO BOX 5698	KETCHIKAN, AK	99901

Gravina Access Project
Adjacent Property Owners for the Preferred Alternative (F1)

PROMECH INC	KETCHIKAN INT'L AIRPORT - LESSOR	1515 TONGASS AVE	KETCHIKAN, AK	99901
R & L LEASING INC		PO BOX 33183	JUNEAU AK	99803
RAITANEN JOHN A & LINDA		4928 SHORELINE DR	KETCHIKAN, AK	99901
RHODES DANIEL PATRICK		119 AUSTIN #1203	KETCHIKAN, AK	99901
RHYNER STEVEN L		3161 CHANNEL DR	JUNEAU , AK	99801
ROSS LIVING TRUST/ BARBER CYNTHIA A	BARBER MATTHEW D & COOL SARAH C	PO BOX 8595	KETCHIKAN, AK	99901
SALAMANCHUK LILLY K		1733 S TONGASS HWY	KETCHIKAN, AK	99901
SAMUELSEN THEODORE A		PO BOX 2546	STANWOOD WA	98292
SEABOLT JACKSON M ESTATE OF	C/O BLANKENSHIP BURLENE	1200 SE HARVEST DR	PULLMAN WA	99163
SELEY LOG & LUMBER LTD - SUBLESSEE	STATE OF ALASKA - LESSOR	PO BOX 5183	KETCHIKAN, AK	99901
SHERMAN WILLIAM G		68 3RD STREET	NEWPORT RI	2840
SIMPSON MICHAEL L & HELENE R		846 FOREST PARK DR	KETCHIKAN, AK	99901
SMITH CARL R & LILLIAN E		836 FOREST PARK DR	KETCHIKAN, AK	99901
STATE OF ALASKA	DEPARTMENT OF NATURAL RESOURCES	400 WILLOUGHBY AVE	JUNEAU , AK	99801
STATE OF ALASKA	DEPARTMENT OF NATURAL RESOURCES	PO BOX 107005	ANCHORAGE, AK	99501
STENSLAND GEORGE E TRUSTEE	ALMINA A STENSLAND TESTAMENTARY TRU	817 N W 107	SEATTLE WA	98177
TAQUAN AIR SERVICE		1007 WATER ST	KETCHIKAN, AK	99901
TATSUDA'S SUPERMARKET INC		PO BOX 8820	KETCHIKAN, AK	99901
TESORO ALASKA PETROLEUM COMPANY	L B WALKER & ASSOCIATES INC	PO BOX 16290	HOUSTON TX	77222
TF ACQUISITION INC	TRIDENT SEAFOODS CORP TAX DEPT	5303 SHILSHOLE AVE NW	SEATTLE WA	98107
TOTEM TAKEOUT	FERGUSON DIANE & LARRI	PO BOX 9121	KETCHIKAN, AK	99901
TRANS ALASKA CONSTRUCTION &	JANSEN JIM	PO BOX 520570	BIG LAKE , AK	99652
U S COAST GUARD	COM 17TH CG	PO BOX 35000	JUNEAU , AK	99802
WEBB OLNEY W JR		PO BOX 23111	KETCHIKAN, AK	99901
ZERBETZ GREGORY & HARRIET		437 MAIN	KETCHIKAN, AK	99901

GRAVINA ACCESS PROJECT

Preliminary Wetlands Jurisdictional Determination



**Agreement 36893013
DOT&PF Project 67698
Federal Project ACHP-0922(5)**



**Prepared for
STATE OF ALASKA
Department of Transportation
and Public Facilities
6860 Glacier Highway
Juneau, Alaska 99801**

**Prepared by
HDR ALASKA, INC.
2525 C Street, Suite 305
Anchorage, AK 99501**

June 2003

1—Introduction

The Alaska Department of Transportation & Public Facilities (DOT&PF) is evaluating alternatives to improve access between Revillagiedo Island and Gravina Island in southeastern Alaska. HDR Alaska, Inc., is supporting the DOT&PF through the process mandated by the National Environmental Policy Act that entails preparation of an environmental impact statement (EIS) in which the effects of project build alternatives and the no-build option are disclosed and evaluated.

A consideration for siting and selection of Gravina Access Project build alternatives is the presence of wetlands. Federal regulations and policies require projects to minimize their impacts on wetlands, and to locate projects in wetlands only if there is no practicable alternative with lesser adverse environmental impact. Wetland identification and analysis of potential wetland-related impacts have been ongoing during development of the project alternatives.

This Preliminary Wetlands Jurisdictional Determination describes the wetland identification process and describes the extent and types of wetlands found in the project area. The Wetland Evaluation Technical Memorandum (HDR, 2002) identifies functions and values of project area wetlands and compares the wetland impacts (in terms of acres) of the alternatives under consideration.

Wetlands. Wetlands, as referenced in this memorandum, are “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 Code of Federal Regulations [CFR] Part 328.3(b)).

Waters of the U.S. Note that this does not include unvegetated areas such as streams, ponds, and most tidal shores; these are other “waters of the U.S.”. Large, year-round open water bodies in the project area are mapped as ponds. All mapped ponds are on Gravina Island and are coded as PUBH (palustrine, unconsolidated bottom, permanently flooded bodies of water).

Uplands. Non-water and non-wetland areas are called uplands.

2—Wetland Determination Methods

The wetland determination for the Gravina Access Project was completed in four phases: office-based premapping, discussions with regulatory agency personnel, field delineation, and office-based GIS mapping and final delineation.

2.1 Office-Based Premapping

Initially, scientists premapped wetlands in a broad project area encompassing the area of all the potential alternatives. This mapping entailed stereoscopic interpretation of color aerial photographs (with a scale of 1" = 400'). Initial wetland/upland boundaries and boundaries between wetland types were drawn on mylar overlays of the photos. Wetland areas were delineated based on vegetation characteristics (e.g., small plant size and low-density stands), hydrologic indicators (such as stream locations and ponding), and topographic clues (such as concave topography). Upland locations were based on the lack of surface water visible in aerial photographs, the presence of tall and dense forest, and steep topography that would allow good surface drainage. Several information sources were examined initially:

- Aerial photographs from AeroMap U.S. (taken 7/2/99, scale 1" = 400'; and taken 8/15/97, scale 1" = 1000'), true color.
- Detailed topographic maps.
- National Wetlands Inventory (NWI) map for quadrangles Ketchikan B-5 and B-6. The NWI maps are based largely on interpretation of aerial photographs and are presented at a coarse scale.
- The detailed preliminary wetland determination prepared by Dunn Environmental Services for the Alaska Department of Transportation & Public Facilities in July 2000. The report provides wetland mapping and a wetland function assessment specifically for the updated Ketchikan International Airport Master Plan (May 2003).
- Existing GIS layers including streams, water bodies, NWI mapping, soil data, slope, and elevation data.

Wetland/upland boundaries drawn in the office were used to plan the field efforts and determine potential problem areas. Initial mapping showed that most of the project area on Gravina and Pennock Islands is wetland.

2.2 Discussions with Agency Personnel

HDR completed interviews of knowledgeable agency representatives regarding the physical and ecological processes that occur in the project area wetland types. During spring of 2000, HDR met with key ADF&G and USFWS staff members in Ketchikan to hear their views on the importance and functions of the wetlands present in the area. A literature review was completed to identify known functions of forested, muskeg, and intertidal wetlands in southeastern Alaska. In addition, HDR met with a representative of the U.S. Army Corps of Engineers in Ketchikan on site to review wetland delineation techniques and discuss wetland functions.

2.3 Field Delineation

Scientists verified wetland boundaries in the field during the summer and fall of 2000. The primary activities of these trips were to ground-truth the office-based preliminary delineation and adjust premapped boundaries to actual on-the-ground conditions. HDR and Corps of Engineers staff met in the field in May 2000 to discuss the delineation methods that would be used. The ground-truthing included identification of wetlands based on the wetland identification methodology described in the Corps of Engineers Wetland Delineation Manual (USACE, 1987). This methodology followed a three-parameter approach to wetland identification and delineation, using the criteria of hydric soils, dominant hydrophytic vegetation, and wetland hydrology. Prior to fieldwork, locations of representative wetland or upland sites (based on pre-mapping) as well as questionable areas were obtained using GIS and loaded into a hand-held GPS unit.

Once in the field, wetland scientists used the predetermined waypoints in the GPS unit to navigate to areas needing investigation. Upon arrival at a waypoint scientists either completed a Corps of Engineers wetland determination form or took detailed notes. Where wetland sites were similar to areas where a data form had previously been completed, scientists took notes and photographs. Geographic coordinates were logged at all data collection locations (sites where wetland determination forms were completed as well as note/photo points). In addition to wetland determination forms, some wetland inventory data sheets were completed to provide information on the wetland functions and values (to be discussed in the EIS). Much of the fieldwork was done in the vicinity of alternatives that are no longer under consideration, but the findings were applicable throughout the project area.

2.4 Office-Based GIS Mapping and Final Delineation

Upon return from the field, the project team mapped sites and amended the office-delineated wetland boundaries on georeferenced aerial photographs using geographic information systems (GIS) technology. The NWI wetland types were determined based on a review of field notes, data forms, and site photographs. Boundaries were digitized into the GIS using existing spatially rectified base mapping and the project's preferred alternative alignments. The final mapping has been prepared for a ¼-mile-wide corridor along each current alternative. To aid in the final mapping, the following resources were used:

- Premapped wetland/upland boundaries
- Digital georeferenced aerial photograph mosaic taken 7/2/99 with 6'-pixel resolution
- Detailed field notes, data forms, and photographs
- GPS coordinates of field observation locations
- COE wetland data forms

3—Wetland Determination Results

Figures 2 through 14 delineate the wetland/upland boundaries and the boundaries between wetland types in the project corridor. The attached figures also show where wetland delineation forms were completed as well as areas where photos and/or notes were taken. Figure 2 shows the locations of field efforts on northwest Gravina. Wetland boundaries were not delineated in this area since the alternative located in this area was not brought forward in the EIS. Data sheets and site photographs are included in Appendix A. Detailed field notes of all observation points are available upon request.

On Gravina and Pennock islands, fieldwork confirmed that nearly all of the alternative areas are wetlands. Uplands on those islands are limited to disturbed areas near the airport, some beach fringes, and some steep slopes along streams and shores. On Revillagigedo Island, uplands were found in disturbed areas and on some steep slopes and high knobs; other sloping areas are wetlands. Four major wetland types exist in the Gravina Access Project area: intertidal marshes and meadows, muskegs, shrub/scrub wetlands, and forested wetlands.

Table 1. Wetland types within the Gravina Access Project area

Wetland Type	Wetland Form #'s
Freshwater Wetlands	
Forested wetlands*	Hole-1, Hole-6, Hole-9, 28-21, 30-13, 1-7, G7, G8, G10, G11, G23
Shrub-scrub wetlands*	Hole-3, Hole-10, 30-7, 30-12
Muskeg wetland*	Hole-2, 28-12, 28-12b, 28-20, 29-16
Ponded Areas (open-water habitat)	-
Marine Areas	
Intertidal/Estuarine Wetlands	Hole-7, Hole-8
Upland Areas	Hole-4, Hole-5, 29-1a, 29-2, 29-7, 30-1, 30-9, 30-14, G1, G12, G17, G22, G24

*Many of the forms include information on more than one type of wetland (i.e., forested-shrub wetlands).

3.1 Intertidal Marshes and Meadows

General Description. These saltwater-influenced wetlands were found on slightly sheltered shores, where the substrate is not bedrock or loose rock, but is sandy. They occur along a narrow band from about the MHW mark to the high tide line. Vegetation in these areas is limited to a dense ground covering of sedges, grasses, and herbs; dominant species were *Carex lyngbyei* (50-90% cover), *Deschampsia caespitosa* (5-20% cover), and *Potentilla egedii* (10%).

Soils and Water. Hydrologic indicators of this type of wetland include soil saturation within 3' of the surface. Hydric soil indicators include sulfidic odor and low-chroma colors. These

wetlands were found only along the shoreline areas of Gravina Island; none were found on the shores of Pennock or Revillagigedo Island.

NWI Code. The NWI code for these wetlands is E2EM1N (estuarine [saltwater] intertidal areas, vegetated with erect herbs, and regularly flooded by tidal waters).

3.2 Muskegs

General Description. These wetlands are extensive on the relatively flatter ground on Gravina and Pennock islands, although the ground still often slopes substantially. Most of these muskegs include many bedrock outcrops. They support a sparse cover of shrub-form shore pine, a lesser cover of shrubby yellow and red cedar and western hemlock, and a dense ground cover dominated by sedges (*Trichophorum caespitosum*, *Carex pluriflora* and other *Carex* species, *Eriophorum* species), crowberry (*Empetrum nigrum*), Labrador tea (*Ledum groenlandicum*), and other herbs. Muskegs include many small “islands” of scrub/shrub wetlands.

Soils and Water. While organic soils were expected in these wettest sites, field scientists found that organic surface layers were generally quite shallow (1-12”), and mineral material was often exposed on the surface of channels and ponds. Sulfidic odor was detected in all soil pits in this type of wetland. Soils were saturated at the surface or within a few inches of the surface. In addition, drainage patterns in wetlands and small ponds were scattered throughout this type of wetland.

NWI Code. All of these wetlands were mapped by NWI. The NWI code for the muskeg areas is PEM1B (palustrine, saturated herbaceous meadows). The NWI code for muskeg areas with substantial amounts of shrubby vegetation is PSS4/EM1B (palustrine, evergreen needle-leaved shrub/grass-like, saturated herbaceous meadows).

3.3 Shrub/Scrub Wetlands

General Description. This wetland type dominates areas adjacent to muskeg wetlands and other areas where tree growth is limited by soil saturation. The tree canopy is sparse enough to allow light to penetrate, promoting a dense shrub and scrub tree understory. Scrub/shrub wetlands often form slightly drier “islands” within the muskegs. They also tend to occur on the slightly better drained (sloping) ground along the streams that run through muskegs.

This wetland type has an open canopy (about 15-50%) of western or mountain hemlock (*Tsuga heterophylla*, *Tsuga mertensiana*). Shore pine (*Pinus contorta*), small Sitka spruce, and red and yellow cedar may also be present. Tall blueberry and rusty menziesia form a dense shrub layer. Prominent herbs are bunchberry, deer cabbage (*Fauria crista-galli*), skunk cabbage, and fernleaf goldthread (*Coptis aspleniifolia*), in addition to a dense ground covering of sphagnum moss (60-70%).

Soils and Water. Scientists in the field noted that soils in the scrub/shrub wetlands were generally saturated near the surface and often exhibited a sulfidic odor within 10” of the surface. Histosols and histic epipedons were common in this type of wetland.

NWI Code. These sites were mapped as wetland by NWI. The NWI code for these wetlands is PSS4B (palustrine, evergreen needle-leaved shrub/scrub dominated areas that are saturated).

3.4 Forested Wetlands

General Description. On Gravina and Pennock islands, most of the forested areas visited were forested wetlands; on Revillagigedo Island, the flatter forested areas were generally wetlands.

This wetland type generally has a closed canopy (about 45-85%) of western hemlock and red and yellow cedar (*Tsuga heterophylla*, *Thuja plicata*, *Chamaecyparis nootkatensis*). Sitka spruce (*Picea sitchensis*) and Pacific crab apple (*Malus fusca*) are also present in several areas. Tall blueberry, red huckleberry, and rusty menziesia (*Vaccinium ovalifolium* or *V. alaskaense*, *Vaccinium parvifolium*, *Menziesia ferruginea*) form the shrub layer (30-50% cover). Prominent herbs are bunchberry (*Cornus canadensis*), deer fern (*Blechnum spicant*), *Maianthemum dilitatum*, and sometimes skunk cabbage (*Lysichiton americanum*). Except for skunk cabbage, the understory plants are not particularly indicative of wet conditions. However, the smaller growth form of the trees indicates that water may limit growth.

Soils and Water. Forested wetlands are generally the best drained of the wetlands in the project area. They often occur on the beach fringe, on steep slopes, and along streams, where topographic relief allows the soils to drain somewhat. Soils in this type of wetland include moderately deep organic deposits (10") with depth to saturated soils ranging from 4" to about 12" below the surface. Scientists in the field noticed a sulfidic odor at most sites within a foot of the surface. They saw little surface water, although they sometimes observed water ponded below exposed tree roots or in other depressions.

NWI Code. The forested wetlands mapped by HDR were generally also mapped as wetland by NWI. The NWI code for the more open forested wetlands is PFO4/SS1B (palustrine, open forested wetlands with deciduous shrub understory, saturated) and PFO4/SS4B (palustrine, open forested wetlands with evergreen shrub understory, saturated). The NWI code for the closed-canopy forested wetlands is PFO4B (palustrine, needle-leaved evergreen forest, saturated).

4—References

Dunn Environmental Services. 2000. Preliminary Wetland Determination: Ketchikan International Airport. Prepared for Alaska Department of Transportation and Public Facilities.

U.S. Federal Register. November 13, 1986 Part II. Rules and Regulations, Vol. 51, No. 219.
U.S. Department of Defense. Corps of Engineers, Department of the Army. 33 CFR Parts 320-330, Regulatory Programs of the Corps of Engineers; Final Rule.

U.S. Army Corps of Engineers Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Washington, DC.

Appendix A

Wetland Determination Forms & Site Photography

NOT INCLUDED

GRAVINA ACCESS PROJECT

Section 404(b)(1) Analysis

Draft



Agreement 36893013

DOT&PF Project 67698

Federal Project ACHP-0922(5)



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1. INTRODUCTION

The Alaska Department of Transportation and Public Facilities (DOT&PF) is evaluating alternatives to improve access between Revillagigedo Island and Gravina Island in southeastern Alaska. HDR Alaska, Inc. is supporting the DOT&PF through the process mandated by the National Environmental Policy Act that entails preparation of an environmental impact statement (EIS) in which the effects of project build alternatives and the no action option are disclosed and evaluated.

A consideration for siting and selection of Gravina Access Project build alternatives is the presence of wetlands. Federal regulations and policies require projects to avoid, and if that is not possible, to minimize their impacts on wetlands, and to locate projects in wetlands only if there is no practicable alternative with lesser adverse environmental impact. Wetland identification and analysis of potential wetland-related impacts have been ongoing during development of the project alternatives.

An alternatives analysis for the Gravina Access Project has been completed to demonstrate compliance with Section 404 (b)(1) Guidelines of the Clean Water Act. That policy requires that all practicable measures be undertaken in project design to avoid adverse impacts to wetlands, then to incorporate all practicable measures to minimize adverse effects, and finally to compensate for unavoidable adverse impacts. This report summarizes the considerations of impact avoidance and the determination of the potential wetland impacts in the selection of project build alternatives, describes the project alternatives and selection of the preliminary preferred alternative, and identifies measures that would be used to avoid, reduce, or compensate for impacts to wetlands.

2. PROJECT PURPOSE AND NEED

Purpose

The purpose of the Gravina Access Project is to improve surface transportation between Revillagigedo Island and Gravina Island.

Need

The need for improving access is threefold:

- To provide the Ketchikan Gateway Borough and its residents more reliable, efficient, convenient, and cost-effective access for vehicles, bicycles, and pedestrians to Borough lands and other developable or recreation lands on Gravina Island in support of the Borough's adopted land use plans.
- To improve the convenience and reliability of access to Ketchikan International Airport for passengers, airport tenants, emergency personnel and equipment, and shipment of freight.
- To promote environmentally sound, planned long-term economic development on Gravina Island.

3. IMPACTS TO WETLANDS

HDR conducted a wetlands determination for each of the alternative alignments. The wetland determination was completed in four phases: office-based premapping, discussions with regulatory agency personnel, field delineation, and office-based GIS mapping and final delineation. The analysis of wetland impacts for the project alternatives is described in detail in the Wetlands Evaluation Technical Memorandum (HDR 2002; Appendix M of the draft EIS). A Preliminary Jurisdictional Determination (HDR 2003) has previously been submitted to the U.S. Army Corps of Engineers for review. Table 1 quantifies (in terms of footprint acres) the anticipated impacts of each alternative on the different wetland types. These calculations were obtained by overlaying the footprint of each alternative on the wetland mapping using GIS analysis functions. The values are shown as acreage comparisons only.

TABLE 1
IMPACTS ON WETLANDS (ACRES)

Wetland Type	<i>No Action Alternative</i>	<i>Bridge Alternatives</i>					<i>Ferry Alternatives</i>			
	No Action	C3(a)	C3(b)	C4	D1	F1	F3	G2	G3	G4
Forested Wetlands	0.0	15.6	14.2	10.6	8.0	24.5	13.0	14.2	10.0	7.7
Shrub/Scrub Wetlands	0.0	3.1	3.0	3.1	3.0	17.9	14.4	2.9	6.5	2.9
Muskegs	0.0	25.3	25.1	25.1	25.1	60.9	57.7	25.3	29.4	24.8
Intertidal Marshes and Meadows	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.7	0.1
Total Wetland Impacts	0.0	44.1	42.4	39.0	36.3	103.3	85.2	42.5	47.5	35.4

4. IMPACT AVOIDANCE

Nearly all lands in the general vicinity of the Ketchikan International Airport on Gravina Island, and most land along the east side of Gravina Island, are wetlands. Similarly, most of Pennock Island is characterized by wetlands. Few areas with substantial uplands exist within the vicinity of Tongass Narrows; therefore, substantial impacts on wetlands are nearly unavoidable by any alternative that includes much new road on land. Several upland areas do occur on Revillagigedo Island, but these areas tend to be steep slopes, where sufficient drainage occurs so wetlands have not developed. These areas are not practicable road locations. Total avoidance of wetlands with this project is therefore unachievable.

To the extent possible, the following wetland avoidance measures were incorporated in the build alternatives:

- Bridges were located to avoid direct disturbance of the estuarine beach meadows and adjacent shorelines and river mouths.
- Ferry parking areas were located on existing filled or disturbed sites where practicable to avoid waters of the U.S.

5. IMPACT MINIMIZATION

The following measures to minimize impacts to wetlands were considered during project development and influenced the choice and placement of the alternatives to consider in the EIS. The suggested mitigation will be implemented during project construction.

- To limit embankment erosion and downgradient sedimentation, erosion and sedimentation control measures would be employed during construction and permanent measures would be employed as early in construction as possible.
- Only clean fill material would be used for the roadway embankment to limit sediment-laden runoff into adjacent wetlands.
- Staking would be done at the planned outside limits of disturbance prior to construction to ensure that disturbance impacts are limited to that area.
- The roadway would be constructed using the minimum-width fill footprint necessary to provide a stable road base.
- Where practicable, the angle of fill slopes will be increased to reduce encroachment into adjacent wetlands.
- The roadway would be constructed with a low-profile embankment to limit the fill footprint.
- Rock would be used to stabilize toes of slopes at ponds and stream crossings to prevent the erosion of fine-grained material into adjacent waters and wetlands.
- Grass seed would be placed on road slopes to prevent the erosion of fine-grained material from the slopes and into the adjacent wetlands. Topsoil would be applied to the surface of road slopes to aid in the reseeding process.
- To protect the integrity of the natural plant communities, plant species indigenous to the area would be used for vegetating road slopes, except that nonnative annual grasses may be used to provide rapid, initial soil cover to prevent runoff of fine-grained material into adjacent wetlands.
- No clearing or grubbing would be done outside of the fill footprint to the extent practicable to limit physical disturbance of wetlands.
- Silt fences would be used adjacent to waterways just beyond the estimated toe of fill to capture fine-grained material contained in runoff.
- Ditch checks would be used to reduce bank erosion during construction to capture sediment-laden runoff and allow for settlement of fine-grained material.
- Sedimentation basins would be used, as necessary (based on the potential volume of storm water runoff), during construction to limit sedimentation of adjacent wetlands and other waters.

- Roadside swales would be designed to keep surface water within the natural drainage basins to allow for sediment-laden water to clear before its discharge to adjacent wetlands and waters.
- Culverts would be installed through fill slopes in appropriate locations to maintain natural flow patterns for surface water to ensure that timing and amounts of inflow to adjacent wetlands and waters retain.

6. ALTERNATIVES CONSIDERED

During the spring of 2000, the DOT&PF developed 18 build concepts for crossing Tongass Narrows. These concepts were based on previous studies, input from agencies and the public, engineering analysis, and the objectives in the purpose and need statement for the project. The build concepts consisted of 11 bridge options, 2 tunnel options, 1 tunnel-and-bridge option, and 4 supplemental ferry options; a No Action option was also considered. These initial options were reviewed, with input from the Ketchikan community and local, state, and federal agencies, and tribes and other Native organizations, to identify reasonable alternatives for the Gravina Access Project. Factors related to cost, environmental impacts, and transportation impacts were examined for each of the initial options, and those options that were not considered practical or feasible from a technical and economic standpoint were eliminated from further consideration. Additional technical studies and public and agency input resulted in the identification of nine reasonable build alternatives (six bridge alternatives, C3[a], C3[b], C4, D1, F1, and F3; and three ferry alternatives, G2, G3, and G4) and the No Action Alternative for the Gravina Access Project EIS. The alternatives evaluated in the EIS are described in the following paragraphs.

NO ACTION ALTERNATIVE

Under the No Action Alternative, no bridge would be constructed and no additional ferry service would be provided between Revillagigedo Island and Gravina Island. The only public access between the islands would continue to be provided by the existing airport ferry service across Tongass Narrows, private boats, and floatplanes. On Revillagigedo Island, the existing ferry terminal is located 2.8 miles north of downtown Ketchikan; on Gravina Island, the terminal is on the waterfront, just east of the airport terminal.

ALTERNATIVE C3(a)

Alternative C3(a) includes a bridge across Tongass Narrows approximately 1,600 feet north of the airport terminal. The bridge would be 5,690 feet long and have a maximum height of approximately 250 feet. The main span of the bridge would have a vertical navigational clearance of 200 feet above high tide and a horizontal navigational clearance of approximately 550 feet. The main span of the bridge would be centered on the cruise ship tracklines and would be over water with depths in excess of 40 feet (at low tide) to accommodate deep draft vessels. These clearances would accommodate one-way passage of cruise ships and two-way passage of most other ships (including Alaska Marine Highway System [AMHS] ferries).

On Revillagigedo Island, the alignment would connect to Signal Road at North Tongass Avenue. From this terminus, the alignment would traverse the hillside southward, gain elevation and turn southwestward. The bridge would cross Tongass Avenue and Tongass Narrows, and then turn southward to parallel the airport runway and touch down (reach the ground surface) on Gravina Island south of the terminal. A 0.4-mile-long airport return loop road would connect the airport terminal and the bridge terminus. The main road would continue around the southern end of the airport runway and then arc northward, extending parallel to and west of the airport runway approximately 2.2 miles to the northern end of the Airport Reserve zone. At the southern end of the runway, the road would be constructed at a grade low enough to accommodate the planned future expansion of the runway, with the runway extended as an overpass of the road.

ALTERNATIVE C3(b)

The Alternative C3(b) bridge would be approximately 4,250 feet long, and have a maximum height of approximately 195 feet. The main span of this bridge would have a vertical navigational clearance of 120 feet above high tide and a horizontal navigational clearance of approximately 500 feet. The main span would be located over water with depths in excess of 40 feet at low tide. These clearances would accommodate passage of AMHS ferries, but not larger cruise ships.

Alternative C3(b) would have the same general alignment on Revillagigedo and Gravina Islands as Alternative C3(a); however, with a lower bridge profile, the position of the C3(b) bridge over Tongass Narrows and at its touchdown on Gravina Island (near the airport terminal) would be north of the C3(a) alignment. This alternative would not need an airport return loop road because the bridge would touch down in front of the airport terminal.

ALTERNATIVE C4

The Alternative C4 bridge would be approximately 4,980 feet long and have a maximum height of approximately 250 feet. The main span of this bridge would have a vertical navigational clearance of 200 feet and a horizontal navigational clearance of approximately 550 feet. The main span of the bridge would be centered on the cruise ship tracklines and would be over water with depths in excess of 40 feet (at low tide) to accommodate deep draft vessels. These clearances would accommodate one-way passage of cruise ships and two-way passage of most other ships, including AMHS ferries.

On Revillagigedo Island, the alignment would connect to Tongass Avenue north of Cambria Drive, across from the access to the existing ferry terminal. From this terminus, it would extend northward and traverse the hillside around the quarry; the bridge would cross over Tongass Avenue and Tongass Narrows, turn southward to parallel the airport runway, and then touch down on Gravina Island south of the airport terminal. A 0.4-mile-long airport return loop road would connect the airport terminal and the bridge terminus. The main road would continue around the southern end of the airport runway and then arc northward, extending parallel to and west of the airport runway approximately 2.2 miles to the northern end of the Airport Reserve zone. At the southern

end of the runway, the road would be constructed at a grade low enough to accommodate the planned future expansion of the runway, with the runway extended as an overpass of the road.

ALTERNATIVE D1

The Alternative D1 bridge would cross Tongass Narrows directly east of the airport terminal. The bridge would be approximately 3,220 feet long and have a maximum height of approximately 160 feet. The main span of this bridge would have a vertical clearance of 120 feet above high tide and a horizontal clearance of 500 feet. The main span would be located over water with depths in excess of 40 feet at low tide. These clearances would accommodate passage of AMHS ferries, but not larger cruise ships.

On Revillagigedo Island, the alignment would connect to Tongass Avenue at Cambria Drive near the existing airport ferry terminal. From this terminus, the alignment would rise along the hillside and turn westward; the bridge would cross over Tongass Avenue and Tongass Narrows, and then turn southward to parallel the shoreline on Gravina Island and touch down south of the airport terminal. A 0.4-mile-long airport return loop road would connect the airport terminal and the bridge terminus. The main road would continue around the southern end of the airport runway and then arc northward, extending parallel to and west of the airport runway approximately 2.2 miles to the northern end of the Airport Reserve zone. At the southern end of the runway, the road would be constructed at a grade low enough to accommodate the planned future expansion of the runway, with the runway extended as an overpass of the road.

ALTERNATIVE F1 (PRELIMINARY PREFERRED)

Alternative F1 would cross Tongass Narrows via Pennock Island with two bridges. One bridge would cross the East Channel and the other would cross the West Channel. The East Channel bridge would be approximately 3,715 feet long and have a maximum height of approximately 250 feet. The bridge would have a vertical navigational clearance of 200 feet above high tide and a horizontal navigational clearance of approximately 550 feet. The main span of the bridge would be centered on the cruise ship tracklines and would be over water with depths in excess of 40 feet (at low tide) to accommodate deep draft vessels. These clearances would accommodate one-way passage of cruise ships and two-way passage of most other ships, including AMHS ferries. The West Channel bridge would be approximately 2,750 feet long and have a maximum height of approximately 160 feet. The bridge would have a vertical navigational clearance of 120 feet above high tide and a horizontal navigational clearance of approximately 500 feet. The main span would be located over water with depths in excess of 40 feet at low tide. These clearances would accommodate passage of AMHS ferries, but not larger cruise ships.

On Revillagigedo Island, Alternative F1 would connect to Tongass Avenue just south of Tatsuda's grocery store and near the southern end of the quarry. From this terminus, the alignment would rise to the southeast along the hillside (and east of the tank farm, the cemetery, and the U.S. Coast Guard Station), turn westward (skirting the southern end of the U.S. Coast Guard Station property, north of the Forest Park subdivision) and cross over Tongass Avenue approximately 1.4 miles south of downtown Ketchikan, then cross

the East Channel to Pennock Island. The roadway would cross Pennock Island at grade. From Pennock Island, the West Channel bridge would cross to Gravina Island, touching down approximately 2.7 miles south of the airport runway. The road would continue northward approximately 4.9 miles to the northern end of the Airport Reserve zone. A 1.2-mile airport access road would be constructed at the southern end of the airport runway. The airport access roadway would be constructed at a grade low enough to accommodate the planned future expansion of the runway, with the runway extended as an overpass of the road.

ALTERNATIVE F3

Like Alternative F1, Alternative F3 would have two bridges that cross Tongass Narrows via Pennock Island. One bridge would cross East Channel and the other bridge would cross West Channel. The East Channel bridge would be approximately 2,065 feet long and have a maximum height of approximately 140 feet. The bridge would have a vertical navigational clearance of 60 feet above high tide, (lower than any of the other bridges), and a horizontal clearance of approximately 500 feet. The main span would be located over water with depths in excess of 40 feet at low tide. These clearances would not accommodate passage of AMHS ferries or the taller cruise ships that currently use the East Channel as their primary navigational route. The West Channel bridge would be approximately 3,270 feet long and have a maximum height of approximately 250 feet. The bridge would have a vertical navigational clearance of 200 feet above high tide and a horizontal navigational clearance of approximately 550 feet. The main span would be located over water with depths in excess of 40 feet at low tide. These clearances would accommodate one-way passage of cruise ships and two-way passage of most other ships, including AMHS ferries.

On Revillagigedo Island, the East Channel bridge would connect to Tongass Avenue, approximately 1.5 miles south of downtown Ketchikan between the U.S. Coast Guard Station and the Forest Park subdivision. From this terminus, the bridge would cross the East Channel to Pennock Island. The roadway would cross Pennock Island at grade. From Pennock Island, the West Channel bridge would cross to Gravina Island, touching down approximately 2.7 miles south of the airport runway. The road would continue northward approximately 4.9 miles to the northern end of the Airport Reserve zone. A 1.2-mile airport access road would be constructed at the southern end of the airport runway. The airport access roadway would be constructed at a grade low enough to accommodate the planned future expansion of the runway, with the runway extended as an overpass of the road.

In response to concerns expressed by cruise ship pilots, the DOT&PF proposes widening a portion of the West Channel to improve its navigational characteristics and mitigate adverse impacts to cruise ships transiting the West Channel. The channel widening would occur in the narrowest part of the West Channel. Currently, the width of the navigable portion of West Channel (i.e., with respect to large cruise ships) is approximately 400 feet at its narrowest point with a minimum depth of 40 feet below mean lower low water. With the proposed channel modifications, this portion of the West Channel would have a channel width of 750 feet: the center 550 feet would have a

minimum depth of 40 feet below low water and both sides of the channel would have a minimum depth of 30 feet below low water. The deepest part of the channel would be centered on the navigational opening of the West Channel bridge.

The bridge would be located at the southern end of the widened channel, which would extend approximately 2,000 feet north of the bridge. South of the bridge crossing, and north of the channel improvement area, the existing channel is wider and deeper than the proposed improved channel.

ALTERNATIVE G2

Alternative G2 would augment the existing airport ferry service, with the existing ferry service continuing to operate at its current location and under its current schedule. Alternative G2 would be a new ferry service for vehicles and passengers between Peninsula Point on Revillagigedo Island and Lewis Point on Gravina Island, crossing Tongass Narrows approximately 2 miles north of the airport

This alternative would require construction of a new ferry terminal on each side of Tongass Narrows and two new ferry vessels. A 4.3-mile road would be constructed on Gravina Island that would extend from the ferry terminal southward approximately 2.6 miles, wrap around the southern end of the airport runway, and then turn northward to the airport terminal. The road at the southern end of the runway would be constructed at a grade low enough to allow for planned future expansion of the runway, with the runway extended as an overpass of the road.

ALTERNATIVE G3

Alternative G3 would augment the existing airport ferry service, with the existing ferry service continuing to operate at its current location and under its current schedule. Alternative G3 would be new ferry service for vehicles and passengers between Ketchikan (near the Plaza Mall at Jefferson Street) on Revillagigedo Island and a location approximately 0.6 miles south of the airport runway on Gravina Island.

This alternative would require construction of a new ferry terminal on each side of Tongass Narrows and two new ferry vessels. Dredging may be required to provide adequate navigational depths for the ferry terminal on Revillagigedo Island. The existing breakwater could also be widened and extended for use as the ferry terminal pier. A road would be constructed on Gravina Island from the ferry terminal northward approximately 3.0 miles to the northern end of the Airport Reserve zone. A 1.2-mile airport access road would be constructed around the southern end of the airport. The road at the southern end of the runway would be constructed at a grade low enough to allow for future planned expansion of the runway, with the runway extended as an overpass of the road.

ALTERNATIVE G4

Alternative G4 would be a new ferry service for vehicles and passengers between Peninsula Point on Revillagigedo Island and Lewis Point on Gravina Island, crossing Tongass Narrows approximately 2 miles north of the airport. Alternative G4 would be

new ferry service for vehicles and passengers adjacent to the existing airport ferry route, crossing Tongass Narrows 2.8 miles north of downtown.

This alternative would require construction of a new ferry terminal on each side of Tongass Narrows, adjacent to the existing airport ferry terminals, and two new ferry vessels. A 3.2-mile road would be constructed on Gravina Island that extends southward from the airport ferry terminals; the roadway would wrap around the southern end of the airport runway, and then turn northward, extending parallel to and west of the airport runway approximately 2.2 miles to the northern end of the Airport Reserve zone. The road at the southern end of the runway would be constructed at a grade low enough to allow for future planned expansion of the runway, with the runway extended as an overpass of the road.

7. SELECTION OF THE PRELIMINARY PREFERRED ALTERNATIVE

Based on the analyses of alternatives presented in this DEIS, and public and agency input, the DOT&PF determined Alternative F1 to be its preliminary Preferred Alternative. The selection of F1 as the preliminary Preferred Alternative focused on several key elements including meeting the project's purpose and need, marine navigation factors, aviation factors, as well as other environmental and engineering factors. Alternative F1 would:

- Meet the need for improved convenience and reliability of access to Ketchikan International Airport and developable and recreation lands on Gravina Island;
- Promote environmentally sound, planned, long-term development on Gravina Island in conformance with Borough plans;
- Allow the continued safe passage of large cruise ships northbound and southbound through Tongass Narrows and East Channel;
- Allow continued separation of cruise ship traffic (East Channel) from the Alaskan Marine Highway System and other marine traffic (West Channel);
- Avoid impact on floatplane facilities at Ketchikan International Airport and waterways designated for floatplane take-offs and landings in Tongass Narrows;
- Not intrude into Ketchikan International Airport's airspace; and
- Avoid impacts to Ketchikan's tourism economy and local revenues.

The DOT&PF received considerable input from the Ketchikan community strongly supporting Alternative F1 and, in January 2003, the Borough Assembly and the Ketchikan City Council both passed resolutions endorsing this alternative.

Alternative F1 is preferable to the other alternatives because it would not affect cruise ship access and operations nor would it affect the Part 77 airspace of Ketchikan International Airport. Alternative F1 would, however, result in adverse impacts to wetlands and upland habitat; change the character of the Pennock Island, which has historically been a community that values its physical separation from the larger Ketchikan community; increase traffic through the downtown core; and potentially affect cultural properties on Pennock Island.

All reasonable alternatives under consideration (including the No Action Alternative) have been developed to a comparable level of detail in this DEIS and their comparative merits have been evaluated. The final selection of an alternative will not be made until the alternatives' impacts and comments on the DEIS and from public hearings have been fully evaluated. The final EIS will identify a preferred alternative.

The following paragraphs provide more detail concerning the rationale for selecting Alternative F1 as the preliminary Preferred Alternative.

Purpose and Need

Alternative F1 was selected as the preliminary Preferred Alternative, in part, because when compared to the ferry and No Action alternatives, it better achieves the project's purpose and need. Alternative F1 improves convenience and reliability of access to Ketchikan International Airport and developable and recreation lands on Gravina Island. Although the ferry alternatives (i.e., G2, G3, and G4) would improve access to the airport and Gravina Island, ferries would only be operational 16 hours a day on a fixed schedule; and are therefore less convenient.

Alternative F1 would be consistent with Ketchikan Gateway Borough's plans for long-term development on Gravina Island. Projections for development on Gravina Island are highest for Alternatives F1 and F3. Alternative F1 would promote development of Gravina Island and Pennock Island, thereby enhancing economic development potential in the Borough.

Marine Navigation

Marine vessels typically using Tongass Narrows include cruise ships, ferries, barges, U.S. Coast Guard vessels, commercial and charter fishing boats, and small craft. In addition, the Tongass Narrows waterway is used by the numerous floatplanes that operate in the Ketchikan area. Several characteristics of Tongass Narrows, including high levels of marine and floatplane traffic, constrained geography, and multiple directions of travel, make navigation in this waterway challenging. During the alternatives analysis for the Gravina Access Project, one of the most controversial issues involved maintaining safe passage of large cruise ships northbound and southbound through Tongass Narrows.

The height of the Alternative C3(b) and Alternative D1 bridges (120 feet) would preclude passage of large cruise ships, which would constrain the direction of their approach to the cruise ship dock in Ketchikan. This would have an adverse impact on the routes and travel times of cruise ships that currently pass through Tongass Narrows. Cruise ships would be required to approach the dock from the south only, whereas they currently can approach from (and depart to) either the north or south; for departure, the ships would be required to turn around and depart to the south. These approach and departure directions would be required regardless of a ship's ultimate direction of travel. Northbound cruise ships requiring greater than 120 feet vertical clearance would leave the Port of Ketchikan and sail south of Gravina Island (through Nichols Passage) and around the western side of Gravina Island. Southbound vessels would enter Tongass Narrows from the south via

Nichols Passage and then depart Ketchikan in the same fashion as today. The typical increase in route distance would be 30.5 nautical miles. Because the Port of Ketchikan would become effectively a one-way in and out for vessels over 120 feet, an additional turning movement would be required either when approaching the dock or after departure.

The direct effects on the cruise ship operations would be expending extra fuel, additional cruising time, and changing their arrival and departure schedules. As a result, cruise ship operators could choose to reduce port time in Ketchikan or possibly by-pass Ketchikan altogether. It is estimated that there would be a 2 percent reduction in total large cruise ship port calls (i.e., eight fewer port calls based on 2001 cruise ship traffic) with Alternative C3(b) or D1; see Appendix K of the DEIS. These direct effects would have adverse secondary economic effects on cruise ship lines, Ketchikan businesses that rely on the patronage of cruise ship passengers, and local government. The potential secondary economic impacts of changes in cruise ship operations are detailed in the DEIS.

While the 200-foot high bridges located near the airport, i.e., Alternatives C3(a) and C4, would allow passage of large cruise ships through Tongass Narrows, they would require placement of piers in the deep navigable waters of Tongass Narrows. This would introduce new, permanent grounding and allision risks, and increase the imperative for the existing custom and practice of one-way traffic for large vessels operating in Tongass Narrows.

Alternative F3 would have an adverse impact on cruise ships because it would require the exclusive use of West Channel by cruise ships, which in turn would require additional maneuvering, increased sailing time, and possibly decreased port time. Currently, cruise ships predominantly use East Channel because it provides a nearly direct alignment to docking and berthing facilities, while a West Channel approach requires considerable maneuvering in order to berth.

The use of West Channel also presents safety concerns for cruise ship lines and ship pilots. The primary issue is that there is no margin for error at the bridge; e.g., a gust of wind, an engineering casualty, an error in responding to helm commands, or the unanticipated presence of opposing traffic, would allow very little time (or space) to react and take sufficient evasive action. Other issues include risks associated with a tidal current set toward Pennock Island, bank suction effects at the bridge site, maintaining vessel control in following winds and currents by increasing speed above the existing speed limit, and the need to execute a 120-degree turn around Pennock Reef, especially when the harbor has other maneuvering vessels and vessels at anchor. The U.S. Coast Guard has indicated that closing East Channel under Alternative F3 to large vessel traffic likely would not meet the reasonable needs of navigation in Tongass Narrows and thus unlikely to be approved for a Section 9 bridge permit.

Alternative F1 is preferable to the other alternatives from a navigation safety standpoint because it would not contribute to conflicts at the navigational choke point next to

Ketchikan International Airport and Alaska Ship and Drydock (as would Alternatives C3(a), C3(b), C4, and D1) and it would not require additional ship maneuvers or cause increased navigational risk for cruise ships transiting West Channel (as would Alternatives C3(b), D1, and F3). In addition, the National Oceanographic and Atmospheric Administration, which is proposing to homeport the research vessel *Fairweather* in Ketchikan at the U.S. Coast Guard base, has voiced strong support for an alternative that provides for large vessel transits in East Channel. Alternative F1 also allows for the continued separation of cruise ship traffic (in the East Channel) from the AMHS and other marine traffic (in the West Channel)

Aviation

Aviation operations in the project area are noteworthy for several reasons:

- Ketchikan International Airport, the primary land-based aviation facility is located on Gravina Island, across Tongass Narrows from Ketchikan.
- The generally steep topography of the islands bordering Tongass Narrows restricts aviation operations and facilities.
- Frequently, many aircraft (particularly floatplanes) operate concurrently in the relatively small and constrained airspace.
- Low-ceiling, low-visibility weather conditions often restrict aviation operations.

Alternative F1 was selected, in part, as the preliminary Preferred Alternative because it avoids adverse impacts on floatplane facilities at Ketchikan International Airport and waterways designated for floatplane take-offs and landings in Tongass Narrows. In addition Alternative F1 does not intrude into Ketchikan International Airport airspace.

Alternatives C3(a), C3(b), C4, and D1 would have a direct adverse impact on floatplane operations, as the bridge presents a new obstruction in the restricted airspace around Ketchikan and Tongass Narrows and would further complicate floatplane operations within airspace that is currently congested. In addition Alternatives C3(a) and C4 would penetrate into Ketchikan International Airport airspace.

Alternative F1 and Alternative F3 would have no adverse effect on floatplane facilities in the Ketchikan area. The two bridges of Alternatives F1 and F3 would adversely affect floatplane operations because pilots would have to either fly over a bridge or taxi under it when traversing the East and West Channels. Proper lighting and marking of the bridge structures would help minimize the risk to floatplanes of collision with the bridge.

Other Factors

The alternatives that employ high bridges over Tongass Narrows near the airport (Alternatives C3(a) and C4) would be more challenging to construct than the other bridge alternatives. This is due to the dimensions of these bridges and the constrained nature of this particular area. This type of structure is typically assembled using a cantilevered method where opposite ends of the facility are constructed until they meet at the center of the bridge span. The 200 feet high bridge alternatives require the construction of a curved span that makes cantilevered construction considerably more challenging and risky. In contrast, the other alternatives are straight structures that are much less risky to

construct. Alternatives C3(a) and C4 will require more frequent closure of Tongass Narrows and thus greater impact to marine navigation.]

All the build alternatives for the Gravina Access Project would include loss or alterations of essential fish habitat (EFH), however Alternative F3 would impact the largest amount of EFH. All the bridge alternatives would require the placement of piers in Tongass Narrows, but Alternative F3 would require channel modification that would remove approximately 14 surface acres of sub tidal slopes and associated vegetation from areas adjacent to Gravina and Pennock Islands. This action would eliminate interspersed eelgrass and kelp beds located in this area. Of the build alternatives, the Alternative F1 has relatively low impacts to EFH.

Several alternatives would require the relocation of homes and businesses. Alternatives C3(a) and C3(b) would require the relocation of one and two residences respectively. In addition Alternatives C4, D1, and G2 would require the relocation of two businesses, and Alternative G3 would require the relocation of six businesses. Alternative F1 would not require residential or business relocations.

8. IMPACT COMPENSATION

Measures to compensate for wetland losses have not yet been developed. Final measures will be based on discussions among DOT&PF, FHWA, COE, EPA, ADNR, and other agencies with jurisdiction.